United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

In cooperation with Kansas
Agricultural Experiment
Station

Soil Survey of Johnson County, Kansas

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 2000. Soil names and descriptions were approved in 2003. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2000. This survey was made cooperatively by the Natural Resources Conservation Service and the Kansas Agricultural Experiment Station. It is part of the technical assistance furnished to the Johnson County Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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Cover: An area of corn alongside a housing area in Johnson County. The information in this soil survey is utilized in agricultural as well as urban areas.

Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at http://www.nrcs.usda.gov.

Contents

Issued 2005

How To Use This Soil Survey

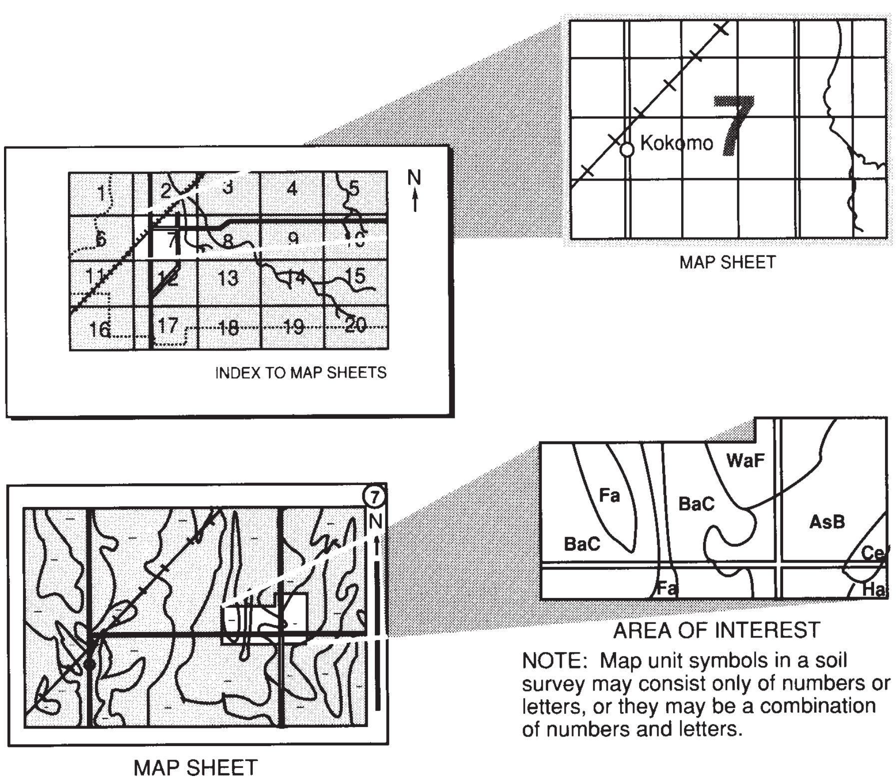
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Harold L. Klaege
State Conservationist
Natural Resources Conservation Service

Soil Survey of
Johnson County, Kansas

By Bruce C. Evans, Natural Resources Conservation Service

Fieldwork by Bruce C. Evans and Lonnie R. Miller, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
the Kansas Agricultural Experiment Station

Johnson County is in the northeastern part of Kansas (fig. 1). The total area of the county is 480 square miles, or 307,066 acres. The population in 2003 was 486,515, and in 2000 Olathe, the county seat, had a population of 92,962. About 88,043 acres of the county are used for field crops, 55,000 acres are used for pastureland, 25,000 acres are used for woodland, and 75,000 acres are used for urban land. The rest is in roads, water areas, and other miscellaneous uses.

The county is in the Central Lowland province of the Interior Plains. The Kansas River has cut a wide valley along the western half of the northern boundary of the county. The western part of Johnson County is made up of gently rolling and undulating uplands. Cedar Creek, Kill Creek, Captain Creek, and Mill Creek dissect the county and flow north to the Kansas River. The eastern part of the county consists of the valley of the Blue River and its tributaries and gently rolling and undulating uplands. The southwestern part of the county consists of the upper waters to the Marais Des Cygnes River, including Bull Creek, Little Bull Creek, and Martin Creek. Elevation of the land ranges from about 742 feet above sea level in the north-central section, along they valley of the Kansas River, to about 1,134 feet above sea level in the south-central part, near Bonita.

This soil survey updates the survey of Johnson County, Kansas, published in 1979 (USDA, 1979). It provides additional information and has larger maps, which show the soils in greater detail.

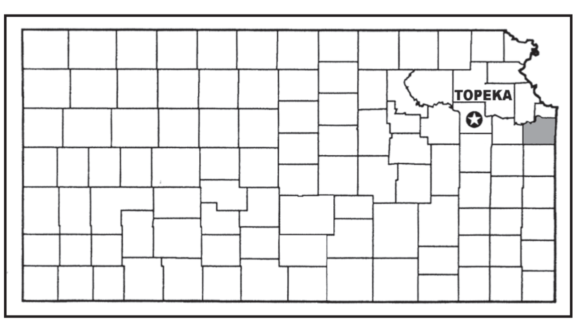


Figure 1.—Location of Johnson County in Kansas.

General Nature of the Survey Area

This section gives information about climate; industry and transportation; settlement; natural resources; and farming.

Climate

Table 1 gives data on temperature and precipitation for the survey area for the period 1971 to 2000. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on the length of the growing season.

In winter, the average temperature is 32.3 degrees F and the average daily minimum temperature is 23.1 degrees. The lowest temperature on record, which occurred at Olathe on December 22, 1989, is -22 degrees. In summer, the average temperature is 76.4 degrees and the average daily maximum temperature is 86.6 degrees. The highest temperature, which occurred at Olathe on July 14, 1954, is 114 degrees.

Growing degree days are shown in table 1. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The average annual total precipitation is about 40.15 inches. Of this, about 30.16 inches, or 75 percent, usually falls in April through October. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was at Olathe on June 9, 1984. Thunderstorms occur on about 44 days each year, and most occur in June with an average of 12.

The average seasonal snowfall is 17.5 inches. The greatest snow depth at any one time during the period of record was 20 inches recorded on March 16, 1960. On an average, 27 days per year have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was 9.5 inches recorded on December 5, 1942.

The average relative humidity in midafternoon is about 59 percent. Humidity is higher at night, and the average at dawn is about 81 percent. The sun shines 68 percent of the time possible in summer and 54 percent in winter. The prevailing wind is from the northwest. Average windspeed is highest, 12.6 miles per hour, in March.

Industry and Transportation

Johnson County is served by four railroads: the Atchison, Topeka, and Santa Fe; the St. Louis and San Francisco (Frisco); the Missouri, Kansas, and Texas (Katy); and the Missouri Pacific. In addition to the extensive railroad network, the county is crossed by Interstates 35, 435, and 635; U.S. Highways 50, 56, 69, and 169; and Kansas Highways 7, 10, 58, and 158. Several airports are located in the county, and the Kansas City International and Municipal Airports are within a one-hour drive for county residents.

Nearly all of the industry in Johnson County is located within the greater Kansas City area and Olathe. Manufactured items include structural steel, aluminum and other metal products, custom made boots and other leather products, battery production, aviation products, construction and farm equipment, veterinary supply products, candy production, building supplies, and the manufacturing of cooking utensils. Athletic supplies are also manufactured in Gardner. The Sunflower Army Ammunition Plant owned by the United States Army Command, near DeSoto, emcompassed 9,065 acres and 500 acres of easements. This facility was determined to be excess property in 1997 and was available for disposal. Overall cleanup activities are being conducted in preparation for the land to be sold.

Settlement of the County

Francisco de Coronado and a group of Spaniards came to Kansas in 1541. These were the first explorers to see Kansas. The area was claimed by Spain, England, France, Mexico, the Republic of Texas, and finally the United States.

The Santa Fe trail crossed Johnson County from east to west. It was established between Westport, Missouri (now Kansas City), and Santa Fe, New Mexico, in 1822.

On May 30, 1854, the Kansas-Nebraska Bill was signed. The two territories of Kansas and Nebraska were formed, and during the next few years thousands of settlers came to the area. The term “Bleeding Kansas” originated as a result of conflicts between pro-slavery and anti-slavery factions during this time.

The first territorial legislature met in Shawnee Methodist Mission in 1855, moving there from Pawnee (now Fort Riley). The Shawnee area is now known as Fairway, part of the greater Kansas City area. Johnson County was created and organized in 1855. Kansas became the 34th state six years later on January 29, 1861.

Population has increased in Johnson County from approximately 17,000 in 1880, 27,000 in 1930, 35,000 in 1940, 60,000 in 1950, 175,000 in 1960, 220,000 in 1970, to 486,515 in 2003.

The greater Kansas City area consists of the cities of Fairway, Leawood, Merriam, Overland Park, Mission, Prairie Village, Roeland Park, Shawnee, Mission Hills, Westwood, and Lenexa. Other cities and municipalities within Johnson County include DeSoto, Gardner, Spring Hill, Olathe, and Edgerton.

Natural Resources

Limestone is one of the most important natural resources in Johnson County. In addition, oil, gas, sand, and gravel are produced commercially. There are 10 named areas of gas and oil production in the county. Two have produced oil and gas, and the remaining eight have produced gas only. Several fields have been abandoned or produce noncommercial gas only.

Sand and gravel are dredged from the Kansas River Valley or from pits in the Kansas River Valley alluvium. The Wyandotte Limestone is the most important geologic unit in the county. Crushed limestone material is used for concrete aggregate, roadstone, agricultural purposes, and building stone.

Water is another important resource in Johnson County. Nearly all of the water required for industry is pumped from alluvium in the Kansas River Valley. The municipalities within the county obtain water from either the Kansas River alluvium, ground water from wells, or runoff trapped in Lakes.

Several rural water districts have been organized across the county. Small drilled wells throughout the county are used for private residences. These wells yield small quantities of water that range in quality from fresh to very saline. Many of the wells yield water that also contains varying amounts of bicarbonates, nitrates, sulfates, or iron. Some of these wells supply water that is suitable only for livestock watering purposes.

Farming

The first settlers in the county settled along valleys and margins between woodland and prairie land in order to be near water, wood, fish, and game. Crops were grown only in sufficient quantities to supply local needs. Cattle constituted their main source of income. Grain production was slow because of a lack of equipment, droughts, and no suitable and effective method of controlling grasshoppers and other pests.

Agricultural development as undergone several changes since these early days. Several crops that were grown 100 or more years ago, such as flax, hemp, tobacco, buckwheat, rice, millet, cotton, castor beans, and broom corn, are no longer produced.

Prior to 1873, the only wheat variety grown was spring wheat. After the introduction of hard red winter wheat in 1875 by Mennonite farmers, the wheat growing industry in Kansas rapidly increased. After 1900, cash grain crop production became the main source of farm income in the county. The main crops presently produced in Johnson County are soybeans, corn, sorghum, alfalfa, and wheat.

Cattle, dairy, and hog production has decreased since 1960. At that time there were 25,900 cattle on farms in the county, compared to 7,881 in 2002. The number of dairy cattle has decreased from 6,100 to 553. Hog production declined from 14,300 to 3,436 by 2002.

Irrigation is utilized, to a small degree, on truck farms in the Kansas River Valley. Sweet corn, sweet potatoes, parsley, watermelons, pumpkins, cantaloupes, turnips, and radishes are some of the vegetable crops that are grown on these farms and sold in the metropolitan Kansas City area. The principal irrigated crops, covering 1,812 acres in 2002, consisted of field corn, grain sorghum, and turf grasses.

Urbanization is constantly decreasing the amount of land being cultivated. From 1954 to 1974, approximately 31,000 acres were developed. Since 1974, land that has been converted to parks, residential, industrial, or commercial land uses is approximately 100,000 acres. The 2002 Census of Agriculture reports 148,606 acres, or 49 percent of the county, remain in agricultural production.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable

them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting components are mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown

on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Grundy silt loam, 1 to 3 percent slopes, is a phase of the Grundy series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Sogn-Vinland complex, 3 to 25 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The map unit Pits is an example.

In the descriptions, “LEP” means linear extensibility percent. The map units that were updated in this survey have a General Considerations statement.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

4015—Chase silt loam, occasionally flooded

Map Unit Composition

Chase: 90 percent
Minor components: 10 percent

Component Descriptions

Chase
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Terraces in river valleys
Parent material: Silty and clayey alluvium
Slope: 0 to 2 percent
Drainage class: Somewhat poorly drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: High (about 10.0 inches)
Shrink-swell potential: Very high (about 9.2 LEP)
Flooding hazard: Occasional
Ponding hazard: None
Depth to seasonal zone of saturation: About 22 to 26 inches
Surface runoff class: High
Ecological site: Loamy Lowland (pe35-42)
Land capability (nonirrigated): 2w

Typical Profile:
A—0 to 10 inches; silt loam
BA—10 to 18 inches; silty clay loam
Bt—18 to 42 inches; silty clay
C—42 to 60 inches; silty clay loam

Minor Components

Wabash
Extent: About 10 percent of the unit
Landform: Depressions on terraces in river valleys
Slope: 0 to 1 percent
Drainage class: Poorly drained

4752—Sogn-Vinland complex, 3 to 25 percent slopes

Map Unit Composition

Sogn: 55 percent
Vinland: 30 percent
Minor components: 15 percent

Component Descriptions

Sogn
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Parent material: Loamy residuum derived from limestone
Slope: 3 to 25 percent
Depth to restrictive feature: 4 to 20 inches to bedrock (lithic)
Drainage class: Somewhat excessively drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: Very low (about 2.6 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface Surface runoff class: Medium
Ecological site: Shallow Limy (pe30-37)
Land capability (nonirrigated): 7s

Typical Profile:
A—0 to 13 inches; silty clay loam
R—13 to 17 inches; unweathered bedrock

Vinland
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Parent material: Sandy and silty residuum derived from shale
Slope: 3 to 25 percent
Depth to restrictive feature: 10 to 20 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: Low (about 3.4 inches)
Shrink-swell potential: Moderate (about 4.9 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Medium
Ecological site: Loamy Upland (pe30-37)
Land capability (nonirrigated): 6s

Typical Profile:
A—0 to 8 inches; silty clay loam
Bw—8 to 12 inches; silty clay loam
C—12 to 16 inches; silty clay loam
Cr—16 to 20 inches; weathered bedrock

Minor Components

Martin
Extent: About 5 percent of the unit

Landform: Hillslopes on uplands
Slope: 3 to 8 percent
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe30-37)

Oska
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 2 to 6 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Well drained
Ecological site: Loamy Upland (pe30-37)

Sibleyville
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 7 to 12 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Well drained
Ecological site: Loamy Upland (pe30-37)

7031—Eudora silt loam, occasionally flooded

Map Unit Composition

Eudora: 85 percent
Minor components: 15 percent

Component Descriptions

Eudora
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Terraces in river valleys
Parent material: Coarse-silty alluvium
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: High (about 11.6 inches)
Shrink-swell potential: Low (about 0.9 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 2w

Typical Profile:
Ap—0 to 7 inches; silt loam
A—7 to 14 inches; silt loam
C1—14 to 40 inches; silt loam
C2—40 to 48 inches; silt loam
C3—48 to 80 inches; very fine sandy loam

Minor Components

Bismarckgrove
Extent: About 10 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent

Drainage class: Well drained
Ecological site: Loamy Lowland (pe30-37)

Bourbonais
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Somewhat excessively drained
Ecological site: Loamy Lowland (pe30-37)

General Considerations

- Most areas are cultivated. This soil is suited to all major crops commonly grown in the valley. It has good potential for hay or tame grasses. Flooding limits the suitability of this soil for many engineering uses.

7035—Eudora-Bismarckgrove fine sandy loams, overwash, occasionally flooded

Map Unit Composition

Eudora: 55 percent
Bismarckgrove: 25 percent
Minor components: 20 percent

Component Descriptions

Eudora
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Terraces in river valleys
Parent material: Coarse-silty alluvium
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: High (about 10.9 inches)
Shrink-swell potential: Low (about 0.9 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 2w

Typical Profile:
Ap—0 to 7 inches; fine sandy loam
A—7 to 14 inches; silt loam
C1—14 to 40 inches; silt loam
C2—40 to 48 inches; silt loam
C3—48 to 80 inches; very fine sandy loam

Bismarckgrove
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Terraces in river valleys
Parent material: Silty alluvium
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: High (about 10.4 inches)

Shrink-swell potential: Moderate (about 4.7 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 2w

Typical Profile:
Ap—0 to 6 inches; fine sandy loam
A1—6 to 14 inches; silty clay loam
A2—14 to 19 inches; silty clay loam
Bw—19 to 29 inches; silt loam
C1—29 to 44 inches; silt loam
2C2—44 to 80 inches; stratified loamy fine sand to fine sandy loam

Minor Components

Bourbonais
Extent: About 10 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Somewhat excessively drained
Ecological site: Loamy Lowland (pe30-37)

Kimo
Extent: About 5 percent of the unit
Landform: Meander scars on flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained

Stonehouse
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Excessively drained
Ecological site: Sandy Lowland (pe30-37)

General Considerations

- Most areas of these soils are cultivated. They are suited to all major crops commonly grown in the valley. These soils have good potential for hay or tame grasses. Flooding limits the suitability of these soils for many engineering uses.

7036—Eudora-Bismarckgrove silt loams, occasionally flooded

Map Unit Composition

Eudora: 50 percent
Bismarckgrove: 25 percent
Minor components: 25 percent

Component Descriptions

Eudora
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Terraces in river valleys
Parent material: Coarse-silty alluvium

Slope: 0 to 1 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: High (about 11.6 inches)
Shrink-swell potential: Low (about 0.9 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 2w

Typical Profile:
Ap—0 to 7 inches; silt loam
A—7 to 14 inches; silt loam
C1—14 to 40 inches; silt loam
C2—40 to 48 inches; silt loam
C3—48 to 80 inches; very fine sandy loam

Bismarckgrove
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Terraces in river valleys
Parent material: Silty alluvium
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: High (about 11.0 inches)
Shrink-swell potential: Moderate (about 4.7 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 2w

Typical Profile:
Ap—0 to 6 inches; silt loam
A1—6 to 14 inches; silty clay loam
A2—14 to 19 inches; silty clay loam
Bw—19 to 29 inches; silt loam
C1—29 to 44 inches; silt loam
2C2—44 to 80 inches; stratified loamy fine sand to fine sandy loam

Minor Components

Bourbonais
Extent: About 15 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Somewhat excessively drained
Ecological site: Loamy Lowland (pe30-37)

Kimo
Extent: About 5 percent of the unit
Landform: Meander scars on flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained

Stonehouse
Extent: About 5 percent of the unit

Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Excessively drained
Ecological site: Loamy Lowland (pe30-37)

General Considerations

- Most areas of these soils are cultivated. They are well suited to all major crops commonly grown in the valley. These soils have good potential for hay or tame grasses. Flooding limits the suitability of these soils for many engineering uses.

7050—Kennebec silt loam, occasionally flooded

Map Unit Composition

Kennebec: 85 percent
Minor components: 15 percent

Component Descriptions

Kennebec
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Flood plains in river valleys
Parent material: Silty alluvium
Slope: 0 to 1 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: Very high (about 13.5 inches)
Shrink-swell potential: Moderate (about 3.7 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: About 40 to 44 inches
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 2w

Typical Profile:
Ap—0 to 8 inches; silt loam
A1—8 to 18 inches; silt loam
A2—18 to 32 inches; silt loam
A3—32 to 41 inches; silt loam
AC—41 to 54 inches; silt loam
C—54 to 80 inches; silt loam

Minor Components

Kennebec
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Moderately well drained
Ecological site: Loamy Lowland (pe30-37)

Muscotah
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent

Drainage class: Somewhat poorly drained
Ecological site: Loamy Lowland (pe30-37)

Wabash
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Poorly drained
Ecological site: Loamy Lowland (pe30-37)

General Considerations

- Most areas of this soil are cultivated. This soil is well suited to all major crops commonly grown in the valley. This soil has good potential for hay or tame grasses. Flooding limits the suitability of this soil for many engineering uses.

7051—Kennebec silt loam, frequently flooded

Map Unit Composition

Kennebec: 85 percent
Minor components: 15 percent

Component Descriptions

Kennebec
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Channels in river valleys
Parent material: Silty alluvium
Slope: 0 to 1 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: Very high (about 13.5 inches)
Shrink-swell potential: Moderate (about 3.7 LEP)
Flooding hazard: Frequent
Depth to seasonal zone of saturation: About 40 to 44 inches
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 6w

Typical Profile:
A1—0 to 8 inches; silt loam
A2—8 to 18 inches; silt loam
A3—18 to 32 inches; silt loam
A4—32 to 41 inches; silt loam
AC—41 to 54 inches; silt loam
C—54 to 80 inches; silt loam

Minor Components

Muscotah
Extent: About 10 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Ecological site: Loamy Lowland (pe30-37)

Wabash

Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Poorly drained
Ecological site: Loamy Lowland (pe30-37)

General Considerations

- Most areas of this soil are wooded. This soil is not suited to all major crops commonly grown in the valley. This soil has good potential for hay or tame grasses. Flooding limits the suitability of this soil for many engineering uses.

7055—Kimo silty clay loam, occasionally flooded

Map Unit Composition

Kimo: 85 percent
Minor components: 15 percent

Component Descriptions

Kimo
MLRA: 106—Nebraska and Kansas Loess-Drift Hills
Landform: Meander scars on terraces in river valleys
Parent material: Clayey over loamy alluvium
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: High (about 11.3 inches)
Shrink-swell potential: Very high (about 9.2 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: About 22 to 26 inches
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 2w

Typical Profile:
Ap—0 to 7 inches; silty clay loam
A1—7 to 15 inches; silty clay
A2—15 to 23 inches; silty clay loam
AC—23 to 27 inches; silty clay loam
2C1—27 to 60 inches; silt loam
2C2—60 to 80 inches; silt loam

Minor Components

Bismarckgrove
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Loamy Lowland (pe30-37)

Eudora
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent

Drainage class: Well drained
Ecological site: Loamy Lowland (pe30-37)

Kiro
Extent: About 5 percent of the unit
Landform: Depressions on flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Poorly drained

General Considerations

- Most areas of this soil are cultivated. This soil is suited to all major crops commonly grown in the valley. This soil has good potential for hay or tame grasses. Flooding, ponding, and high shrink-swell limits the suitability of this soil for many engineering uses.

7089—Stonehouse-Eudora fine sandy loams, overwash, occasionally flooded

Map Unit Composition

Stonehouse: 50 percent
Eudora: 30 percent
Minor components: 20 percent

Component Descriptions

Stonehouse
MLRA: 106—Nebraska and Kansas Loess-Drift Hills
Landform: Terraces in river valleys
Parent material: Sandy alluvium
Slope: 0 to 2 percent
Drainage class: Excessively drained
Slowest saturated hydraulic conductivity: High (about 1.98 inches per hour)
Available water capacity: Low (about 5.3 inches)
Shrink-swell potential: Low (about 0.0 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Negligible
Ecological site: Sandy Lowland (pe30-37)
Land capability (nonirrigated): 4s

Typical Profile:
Ap—0 to 9 inches; fine sandy loam
C1—9 to 23 inches; loamy fine sand
C2—23 to 31 inches; stratified loamy sand
C3—31 to 45 inches; stratified fine sand
C4—45 to 71 inches; stratified sandy loam
C5—71 to 80 inches; stratified loamy fine sand

Eudora
MLRA: 106—Nebraska and Kansas Loess-Drift Hills
Landform: Terraces in river valleys
Parent material: Coarse-silty alluvium
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)

Available water capacity: High (about 10.9 inches)
Shrink-swell potential: Low (about 0.9 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 2w

Typical Profile:
Ap—0 to 7 inches; fine sandy loam
A—7 to 14 inches; silt loam
C1—14 to 40 inches; silt loam
C2—40 to 48 inches; silt loam
C3—48 to 80 inches; very fine sandy loam

Minor Components

Kimo
Extent: About 10 percent of the unit
Landform: Meander scars on flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained

Bismarckgrove
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Loamy Lowland (pe30-37)

Bourbonais
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 2 percent
Drainage class: Somewhat excessively drained

General Considerations

- Most areas of these soils are cultivated. The Stonehouse soil is poorly suited to some crops and the Eudora soil is well suited to all crops grown in the valley. These soils has good potential for hay or tame grasses. Flooding and seepage limits the suitability of these soils for many engineering uses.

7090—Wabash silty clay loam, occasionally flooded

Map Unit Composition

Wabash: 91 percent
Minor components: 9 percent

Component Descriptions

Wabash
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Terraces in river valleys
Parent material: Clayey alluvium
Slope: 0 to 1 percent
Drainage class: Poorly drained

Slowest saturated hydraulic conductivity: Very low
Available water capacity: Moderate (about 8.0 inches)
Shrink-swell potential: Very high (about 10.4 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: About 2 to 9 inches
Surface runoff class: Very high
Ecological site: Clay Lowland (pe30-37)
Land capability (nonirrigated): 3w

Typical Profile:
Ap—0 to 5 inches; silty clay loam
A—5 to 16 inches; silty clay loam
Bg—16 to 52 inches; silty clay
Cg—52 to 70 inches; silty clay

Minor Components

Kennebec
Extent: About 6 percent of the unit
Landform: Flood plains in river valleys
Slope: 0 to 2 percent
Drainage class: Moderately well drained
Ecological site: Loamy Lowland (pe30-37)

Reading
Extent: About 3 percent of the unit
Landform: Terraces in river valleys
Slope: 0 to 2 percent
Drainage class: Well drained
Ecological site: Loamy Lowland (pe35-42)

7105—Belvue silt loam, escarpment, 2 to 12 percent slopes

Map Unit Composition

Belvue: 85 percent
Minor components: 15 percent

Component Descriptions

Belvue
MLRA: 106—Nebraska and Kansas Loess-Drift Hills
Landform: Terraces in river valleys
Parent material: Coarse-silty alluvium
Slope: 2 to 12 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: High (about 11.4 inches)
Shrink-swell potential: Low (about 1.8 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 2w

Typical Profile:
Ap—0 to 6 inches; silt loam
C1—6 to 11 inches; silt loam
C2—11 to 24 inches; very fine sandy loam
C3—24 to 39 inches; silt loam
C4—39 to 58 inches; silt loam
C5—58 to 80 inches; silt loam

Minor Components

Bismarckgrove
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Loamy Lowland (pe30-37)

Bourbonais
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Somewhat excessively drained
Ecological site: Loamy Lowland (pe30-37)

Kimo
Extent: About 5 percent of the unit
Landform: Meander scars on flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained

General Considerations

- Most areas of this soil are cultivated. This soil is suited to all crops grown in the valley. This soil has good potential for hay or tame grasses. Flooding and slope limits the suitability of this soil for many engineering uses.

7106—Eudora-Bismarckgrove silt loams, rarely flooded

Map Unit Composition

Eudora: 55 percent
Bismarckgrove: 30 percent
Minor components: 15 percent

Component Descriptions

Eudora
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Terraces in river valleys
Parent material: Coarse-silty alluvium
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: High (about 11.6 inches)
Shrink-swell potential: Low (about 0.9 LEP)
Flooding hazard: Rare
Depth to seasonal zone of saturation: More than 6 feet

Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 1

Typical Profile:
Ap—0 to 7 inches; silt loam
A—7 to 14 inches; silt loam
C1—14 to 40 inches; silt loam
C2—40 to 48 inches; silt loam
C3—48 to 80 inches; very fine sandy loam

Bismarckgrove
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Terraces in river valleys
Parent material: Silty alluvium
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: High (about 11.0 inches)
Shrink-swell potential: Moderate (about 4.7 LEP)
Flooding hazard: Rare
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 2w

Typical Profile:
Ap—0 to 6 inches; silt loam
A1—6 to 14 inches; silty clay loam
A2—14 to 19 inches; silty clay loam
Bw—19 to 29 inches; silt loam
C1—29 to 44 inches; silt loam
2C2—44 to 80 inches; stratified loamy fine sand to fine sandy loam

Minor Components

Bourbonais
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Somewhat excessively drained
Ecological site: Loamy Lowland (pe30-37)

Kimo
Extent: About 5 percent of the unit
Landform: Meander scars on flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained

Stonehouse
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Excessively drained
Ecological site: Sandy Lowland (pe30-37)

General Considerations

- Most areas of these soils are cultivated. These soils are well suited to all crops grown in the valley. These soils have good potential for hay or tame grasses. Flooding limits the suitability of these soils for many engineering uses.

7123—Eudora silt loam, rarely flooded

Map Unit Composition

Eudora: 85 percent
Minor components: 15 percent

Component Descriptions

Eudora
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Terraces in river valleys
Parent material: Coarse-silty alluvium
Slope: 0 to 1 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: High (about 11.6 inches)
Shrink-swell potential: Low (about 0.9 LEP)
Flooding hazard: Rare
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 1

Typical Profile:
Ap—0 to 7 inches; silt loam
A—7 to 14 inches; silt loam
C1—14 to 40 inches; silt loam
C2—40 to 48 inches; silt loam
C3—48 to 80 inches; very fine sandy loam

Minor Components

Bismarckgrove
Extent: About 10 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Loamy Lowland (pe30-37)

Bourbonais
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Somewhat excessively drained
Ecological site: Loamy Lowland (pe30-37)

General Considerations

- Most areas of this soil are cultivated. This soil is well suited to all major crops commonly grown in the valley. This soil has good potential for hay or tame grasses. Flooding limits the suitability of this soil for many engineering uses.

7155—Kimo silty clay loam, rarely flooded

Map Unit Composition

Kimo: 85 percent
Minor components: 15 percent

Component Descriptions

Kimo
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Meander scar on terraces in river valleys
Parent material: Clayey over loamy alluvium
Slope: 0 to 1 percent
Drainage class: Somewhat poorly drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: High (about 11.3 inches)
Shrink-swell potential: Very high (about 9.2 LEP)
Flooding hazard: Rare
Depth to seasonal zone of saturation: About 22 to 26 inches
Surface runoff class: Low
Ecological site: Loamy Lowland (pe30-37)
Land capability (nonirrigated): 2w

Typical Profile:
Ap—0 to 7 inches; silty clay loam
A1—7 to 15 inches; silty clay
A2—15 to 23 inches; silty clay loam
AC—23 to 27 inches; silty clay loam
2C1—27 to 60 inches; silt loam
2C2—60 to 80 inches; silt loam

Minor Components

Bismarckgrove
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Loamy Lowland (pe30-37)

Eudora
Extent: About 5 percent of the unit
Landform: Flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Well drained
Ecological site: Loamy Lowland (pe30-37)

Kiro
Extent: About 5 percent of the unit
Landform: Depressions on flood-plain steps in river valleys
Slope: 0 to 1 percent
Drainage class: Poorly drained

General Considerations

- Most areas of this soil are cultivated. This soil is suited to all major crops commonly grown in the valley. This soil has good potential for hay or tame grasses. Flooding,

ponding, and high shrink-swell limits the suitability of this soil for many engineering uses.

7170—Reading silt loam, rarely flooded

Map Unit Composition

Reading: 90 percent
Minor components: 10 percent

Component Descriptions

Reading
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Terraces in river valleys
Parent material: Fine-silty alluvium
Slope: 0 to 2 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: High (about 11.5 inches)
Shrink-swell potential: Moderate (about 5.4 LEP)
Flooding hazard: Rare
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Low
Ecological site: Loamy Lowland (pe35-42)
Land capability (nonirrigated): 1

Typical Profile:
Ap—0 to 10 inches; silt loam
A—10 to 15 inches; silty clay loam
Bt—15 to 35 inches; silty clay loam
BC—35 to 41 inches; silty clay loam
C—41 to 60 inches; silty clay

Minor Components

Chase
Extent: About 5 percent of the unit
Landform: Terraces in river valleys
Slope: 0 to 2 percent
Drainage class: Somewhat poorly drained
Ecological site: Loamy Lowland (pe35-42)

Wabash
Extent: About 5 percent of the unit
Landform: Terraces in river valleys
Slope: 0 to 1 percent
Drainage class: Poorly drained

7251—Grundy silt loam, 1 to 3 percent slopes

Map Unit Composition

Grundy: 100 percent

Component Descriptions

Grundy
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Hillslopes on uplands
Parent material: Silty and clayey loess
Slope: 1 to 3 percent
Drainage class: Somewhat poorly drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: High (about 10.6 inches)
Shrink-swell potential: Very high (about 9.2 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 12 to 17 inches
Surface runoff class: High
Ecological site: Clay Upland (pe30-37)
Land capability (nonirrigated): 2e

Typical Profile:
Ap—0 to 9 inches; silt loam
A—9 to 15 inches; silty clay loam
Bt—15 to 29 inches; silty clay
BC—29 to 44 inches; silty clay loam
C—44 to 60 inches; silty clay loam

7261—Gymer silt loam, 3 to 7 percent slopes

Map Unit Composition

Gymer: 88 percent
Minor components: 12 percent

Component Descriptions

Gymer
MLRA: 106—Nebraska and Kansas Loess-Drift Hills
Landform: Terraces in river valleys
Hillslopes position: Backslopes
Parent material: Fine-silty alluvium
Slope: 3 to 7 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: High (about 11.4 inches)
Shrink-swell potential: High (about 7.7 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: High
Ecological site: Loamy Upland (pe30-37)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 6 inches; silt loam
AB—6 to 15 inches; silt loam
Bt—15 to 30 inches; silty clay loam
BC—30 to 80 inches; silty clay loam

Minor Components

Martin
Extent: About 3 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 7 percent
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

Morrill
Extent: About 3 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 7 percent
Drainage class: Well drained
Ecological site: Loamy Upland (pe30-37)

Sharpsburg
Extent: About 3 percent of the unit
Landform: Hillslopes on uplands
Slope: 4 to 10 percent
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe30-37)

Thurman
Extent: About 3 percent of the unit
Landform: Hillslopes on uplands
Slope: 4 to 10 percent
Drainage class: Somewhat excessively drained
Ecological site: Savannah (pe30-37)

7285—Ladoga silt loam, 3 to 8 percent slopes

Map Unit Composition

Ladoga: 90 percent
Minor components: 10 percent

Component Descriptions

Ladoga
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Parent material: Silty and clayey loess
Slope: 3 to 8 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: High (about 11.7 inches)
Shrink-swell potential: High (about 7.4 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 46 to 50 inches
Surface runoff class: Medium
Ecological site: Loamy Upland (pe30-37)
Land capability (nonirrigated): 3e

Typical Profile:
A—0 to 8 inches; silt loam
AB—8 to 13 inches; silt loam

Bt—13 to 31 inches; silty clay loam
BC—31 to 60 inches; silty clay loam

Minor Components

Martin
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 2 to 5 percent
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

7286—Ladoga silt loam, 8 to 15 percent slopes

Map Unit Composition

Ladoga: 85 percent
Vinland: 15 percent

Component Descriptions

Ladoga
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Parent material: Silty and clayey loess
Slope: 8 to 15 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: High (about 11.7 inches)
Shrink-swell potential: High (about 7.4 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 46 to 50 inches
Surface runoff class: High
Ecological site: Loamy Upland (pe30-37)
Land capability (nonirrigated): 4e

Typical Profile:
A—0 to 8 inches; silt loam
AB—8 to 13 inches; silt loam
Bt—13 to 31 inches; silty clay loam
BC—31 to 60 inches; silty clay loam

Minor Components

Martin
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 2 to 5 percent
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

Vinland
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 7 percent
Depth to restrictive feature: 10 to 20 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained

Ecological site: Loamy Upland (pe35-42)

7302—Martin silty clay loam, 3 to 7 percent slopes

Map Unit Composition

Martin: 90 percent
Minor components: 10 percent

Component Descriptions

Martin
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Hillslopes on uplands
Parent material: Silty and clayey colluvium derived from limestone and shale over silty and clayey residuum derived from limestone and shale
Slope: 3 to 7 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: High (about 9.9 inches)
Shrink-swell potential: Very high (about 9.9 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 22 to 26 inches
Surface runoff class: Medium
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 9 inches; silty clay loam
AB—9 to 15 inches; silty clay loam
Bt—15 to 34 inches; silty clay
BC—34 to 60 inches; silty clay

Minor Components

Oska
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 4 to 8 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Well drained
Ecological site: Loamy Upland (pe35-42)

Vinland
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 7 percent
Depth to restrictive feature: 10 to 20 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained
Ecological site: Loamy Upland (pe35-42)

7330—Martin-Vinland silty clay loams, 5 to 10 percent slopes

Map Unit Composition

Martin: 45 percent

Vinland: 40 percent
Minor components: 15 percent

Component Descriptions

Martin
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Parent material: Silty and clayey colluvium derived from limestone and shale over silty and clayey residuum derived from limestone and shale
Slope: 5 to 10 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: High (about 9.9 inches)
Shrink-swell potential: Very high (about 9.9 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 22 to 26 inches
Surface runoff class: Very high
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 6e

Typical Profile:
A—0 to 9 inches; silty clay loam
AB—9 to 15 inches; silty clay loam
Bt—15 to 34 inches; silty clay
BC—34 to 60 inches; silty clay

Vinland
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Parent material: Sandy and silty residuum derived from shale
Slope: 5 to 10 percent
Depth to restrictive feature: 10 to 20 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: Low (about 3.6 inches)
Shrink-swell potential: Moderate (about 5.1 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: High
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 3e

Typical Profile:
A—0 to 4 inches; silty clay loam
Bw—4 to 11 inches; silty clay loam
C—11 to 18 inches; silty clay loam
Cr—18 to 20 inches; weathered bedrock

Minor Components

Sogn
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 15 to 20 percent
Depth to restrictive feature: 4 to 20 inches to bedrock (lithic)

Drainage class: Somewhat excessively drained
Ecological site: Shallow Limy (pe30-37)

Rock outcrop
Extent: About 5 percent of the unit

7433—Morrill loam, 3 to 7 percent slopes

Map Unit Composition

Morrill: 85 percent
Minor components: 15 percent

Component Descriptions

Morrill
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Hillslopes on uplands
Parent material: Fine-loamy glaciofluvial deposits
Slope: 3 to 7 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: High (about 10.2 inches)
Shrink-swell potential: Moderate (about 5.1 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Medium
Ecological site: Loamy Upland (pe30-37)
Land capability (nonirrigated): 3e

Typical Profile:
A—0 to 9 inches; loam
BA—9 to 13 inches; loam
Bt—13 to 22 inches; clay loam
BC—22 to 39 inches; clay loam
C—39 to 60 inches; clay loam

Minor Components

Grundy
Extent: About 8 percent of the unit
Landform: Hillslopes on uplands
Slope: 1 to 3 percent
Drainage class: Somewhat poorly drained
Ecological site: Clay Upland (pe30-37)

Ladoga
Extent: About 7 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 8 percent
Drainage class: Moderately well drained

7460—Oska silty clay loam, 3 to 6 percent slopes

Map Unit Composition

Oska: 88 percent
Minor components: 12 percent

Component Descriptions

Oska

MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Hillslopes on uplands
Parent material: Silty and clayey residuum derived from limestone and shale
Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: Moderate (about 6.4 inches)
Shrink-swell potential: Very high (about 9.9 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: High
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 9 inches; silty clay loam
Bt—9 to 31 inches; silty clay
C—31 to 38 inches; silty clay loam
R—38 to 42 inches; unweathered bedrock

Minor Components

Gymer
Extent: About 3 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 8 percent
Drainage class: Well drained
Ecological site: Loamy Upland (pe30-37)

Martin
Extent: About 3 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 7 percent
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

Sogn
Extent: About 3 percent of the unit
Landform: Hillslopes on uplands
Slope: 7 to 15 percent
Depth to restrictive feature: 4 to 20 inches to bedrock (lithic)
Drainage class: Somewhat excessively drained
Ecological site: Shallow Limy (pe30-37)

Vinland
Extent: About 3 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 7 percent
Depth to restrictive feature: 10 to 20 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained
Ecological site: Loamy Upland (pe35-42)

7462—Oska-Martin complex, 4 to 8 percent slopes

Map Unit Composition

Oska: 50 percent
Martin: 30 percent
Minor components: 20 percent

Component Descriptions

Oska
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Parent material: Silty and clayey residuum derived from limestone and shale
Slope: 4 to 8 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: Low (about 5.6 inches)
Shrink-swell potential: Very high (about 9.2 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: High
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 4e

Typical Profile:
Ap—0 to 8 inches; silty clay loam
BA—8 to 16 inches; silty clay loam
Bt—16 to 32 inches; silty clay
R—32 to 36 inches; unweathered bedrock

Martin
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Parent material: Silty and clayey colluvium derived from limestone and shale over silty and clayey residuum derived from limestone and shale
Slope: 4 to 8 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: High (about 9.9 inches)
Shrink-swell potential: Very high (about 9.9 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 22 to 26 inches
Surface runoff class: Very high
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 4e

Typical Profile:
Ap—0 to 9 inches; silty clay loam
AB—9 to 15 inches; silty clay loam
Bt—15 to 34 inches; silty clay
BC—34 to 60 inches; silty clay

Minor Components

Sharpsburg
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 8 percent
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe30-37)

Sibleyville
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 7 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Well drained
Ecological site: Loamy Upland (pe35-42)

Sogn
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 15 to 20 percent
Depth to restrictive feature: 4 to 20 inches to bedrock (lithic)
Drainage class: Somewhat excessively drained
Ecological site: Shallow Limy (pe30-37)

Vinland
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 7 percent
Depth to restrictive feature: 10 to 20 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained
Ecological site: Loamy Upland (pe35-42)

7502—Pawnee clay loam, 3 to 7 percent slopes

Map Unit Composition

Pawnee: 85 percent
Minor components: 15 percent

Component Descriptions

Pawnee
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Hillslopes on uplands
Parent material: Clayey drift
Slope: 3 to 7 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: Moderate (about 7.8 inches)
Shrink-swell potential: High (about 7.9 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 12 to 17 inches
Surface runoff class: High
Ecological site: Clay Upland (pe30-37)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 8 inches; clay loam
BA—8 to 12 inches; clay loam
Bt—12 to 40 inches; clay
BC—40 to 49 inches; clay loam
C—49 to 60 inches; clay loam

Minor Components

Grundy
Extent: About 8 percent of the unit
Landform: Hillslopes on uplands
Slope: 1 to 3 percent
Drainage class: Somewhat poorly drained
Ecological site: Clay Upland (pe30-37)

Woodson
Extent: About 7 percent of the unit
Landform: Hillslopes on uplands
Slope: 0 to 2 percent
Drainage class: Somewhat poorly drained
Ecological site: Clay Upland (pe35-42)

7525—Chillicothe silt loam, 2 to 5 percent slopes

Map Unit Composition

Chillicothe: 85 percent
Minor components: 15 percent

Component Descriptions

Chillicothe
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Hillslopes on uplands
Parent material: Silty and clayey loess and/or silty and clayey residuum
Slope: 2 to 5 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: High (about 11.5 inches)
Shrink-swell potential: Moderate (about 4.9 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 28 to 32 inches
Surface runoff class: Medium
Ecological site: Loamy Upland (pe30-37)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 5 inches; silt loam
A—5 to 13 inches; silt loam
BA—13 to 19 inches; silty clay loam
Bt1—19 to 31 inches; silty clay loam
Bt2—31 to 43 inches; silty clay loam
Bt3—43 to 48 inches; silty clay loam
2Bt4—48 to 60 inches; silty clay
2Bt5—60 to 81 inches; silty clay
R—81 to 85 inches; weathered bedrock

Minor Components

Oska
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 2 to 5 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Well drained
Ecological site: Loamy Upland (pe35-42)

Bendena
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 2 to 5 percent
Depth to restrictive feature: 4 to 20 inches to bedrock (lithic)
Drainage class: Somewhat excessively drained
Ecological site: Shallow Limy (pe30-37)

7535—Sharpsburg silt loam, 4 to 8 percent slopes

Map Unit Composition

Sharpsburg: 85 percent
Minor components: 15 percent

Component Descriptions

Sharpsburg
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Parent material: Silty and clayey loess
Slope: 4 to 8 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: Very high (about 12.2 inches)
Shrink-swell potential: High (about 7.4 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 36 to 40 inches
Surface runoff class: Medium
Ecological site: Loamy Upland (pe30-37)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 9 inches; silt loam
AB—9 to 13 inches; silty clay loam
Bt—13 to 35 inches; silty clay loam
BC—35 to 60 inches; silty clay loam

Minor Components

Martin
Extent: About 8 percent of the unit
Landform: Hillslopes on uplands
Slope: 2 to 5 percent
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

Oska
Extent: About 7 percent of the unit
Landform: Hillslopes on uplands
Slope: 4 to 8 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Well drained
Ecological site: Loamy Upland (pe35-42)

7545—Sharpsburg-Urban land complex, 4 to 8 percent slopes

Map Unit Composition

Sharpsburg: 55 percent
Urban land: 45 percent

Component Descriptions

Sharpsburg
MLRA: 112—Cherokee Prairies and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Parent material: Silty and clayey loess
Slope: 4 to 8 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: Very high (about 12.2 inches)
Shrink-swell potential: High (about 7.4 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 36 to 40 inches
Surface runoff class: Medium
Ecological site: Loamy Upland (pe30-37)
Land capability (nonirrigated): 3e

Typical Profile:
A—0 to 9 inches; silt loam
AB—9 to 13 inches; silty clay loam
Bt—13 to 35 inches; silty clay loam
BC—35 to 60 inches; silty clay loam

Urban land
MLRA: 112—Cherokee Prairies and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Very high

7603—Sibleyville loam, 3 to 7 percent slopes

Map Unit Composition

Sibleyville: 85 percent
Minor components: 15 percent

Component Descriptions

Sibleyville
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Hillslopes on uplands

Hillslopes position: Backslopes
Parent material: Fine-loamy residuum derived from sandstone
Slope: 3 to 7 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: Low (about 4.5 inches)
Shrink-swell potential: Moderate (about 3.9 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Medium
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 3e

Typical Profile:
A—0 to 7 inches; loam
Bt—7 to 15 inches; loam
C—15 to 27 inches; channery loam
Cr—27 to 31 inches; weathered bedrock

Minor Components

Woodson
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 1 to 3 percent
Drainage class: Somewhat poorly drained
Ecological site: Clay Upland (pe35-42)

Summit
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 7 percent
Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

General Considerations

- Most areas of this soil are cultivated. This soil is suited to all crops commonly grown in the watershed. Erosion is a serious hazard, but it can be controlled by contour farming or conservation tillage. This soil has good potential for hay, tame grasses, and trees. The depth to bedrock limits the suitability of this soil for many engineering uses.

7607—Sibleyville-Vinland loams, 3 to 7 percent slopes

Map Unit Composition

Sibleyville: 45 percent
Vinland: 35 percent
Minor components: 20 percent

Component Descriptions

Sibleyville
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Hillslopes on uplands
Parent material: Sandy and silty residuum derived from sandstone and shale

Slope: 3 to 7 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: Low (about 5.1 inches)
Shrink-swell potential: Moderate (about 4.7 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Medium
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 4e

Typical Profile:
A—0 to 8 inches; loam
Bt—8 to 22 inches; clay loam
C—22 to 29 inches; clay loam
Cr—29 to 33 inches; weathered bedrock

Vinland
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Hillslopes on uplands
Parent material: Sandy and silty residuum derived from shale
Slope: 3 to 7 percent
Depth to restrictive feature: 10 to 20 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: Low (about 3.9 inches)
Shrink-swell potential: Moderate (about 5.1 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Medium
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 6e

Typical Profile:
A—0 to 4 inches; silty clay loam
Bw—4 to 11 inches; silty clay loam
C—11 to 18 inches; silty clay loam
Cr—18 to 22 inches; weathered bedrock

Minor Components

Martin
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 2 to 5 percent
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

Sogn
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 7 to 15 percent
Depth to restrictive feature: 4 to 20 inches to bedrock (lithic)
Drainage class: Somewhat excessively drained
Ecological site: Shallow Limy (pe30-37)

7658—Vinland-Rock outcrop complex, 15 to 45 percent slopes

Map Unit Composition

Vinland: 60 percent
Rock outcrop: 20 percent
Minor components: 20 percent

Component Descriptions

Vinland
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Parent material: Sandy and silty residuum derived from shale
Slope: 15 to 45 percent
Depth to restrictive feature: 10 to 20 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: Low (about 3.6 inches)
Shrink-swell potential: Moderate (about 5.1 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: High
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 6e

Typical Profile:
A—0 to 4 inches; silty clay loam
Bw—4 to 11 inches; silty clay loam
C—11 to 17 inches; silty clay loam
Cr—17 to 21 inches; weathered bedrock

Rock outcrop
MLRA: 106—Nebraska and Kansas Loess-Drift Hills, 112—Cherokee Prairies, and 107B—Iowa and Missouri Deep Loess Hills
Landform: Hillslopes on uplands
Slope: 15 to 45 percent
Drainage class: Excessively drained
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Very high
Land capability (nonirrigated): 8

Minor Components

Martin
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 7 to 11 percent
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

Oska
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 3 to 6 percent

Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Well drained
Ecological site: Loamy Upland (pe35-42)

Sogn
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 15 to 20 percent
Depth to restrictive feature: 4 to 20 inches to bedrock (lithic)
Drainage class: Somewhat excessively drained
Ecological site: Shallow Limy (pe30-37)

7805—Arisburg silt loam, 1 to 3 percent slopes

Map Unit Composition

Arisburg: 85 percent
Minor components: 15 percent

Component Descriptions

Arisburg
MLRA: 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Summit
Parent material: Loess
Slope: 1 to 3 percent
Drainage class: Somewhat poorly drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: High (about 10.5 inches)
Shrink-swell potential: Very high (about 9.2 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 16 to 20 inches
Surface runoff class: Medium
Ecological site: Loamy Upland (pe30-37)
Land capability (nonirrigated): 2e

Typical Profile:
Ap—0 to 9 inches; silt loam
Bt—9 to 15 inches; silty clay loam
Btg1—15 to 22 inches; silty clay
Btg2—22 to 29 inches; silty clay
Btg3—29 to 44 inches; silty clay
BC—44 to 60 inches; silty clay loam

Minor Components

Summit
Extent: About 10 percent of the unit
Landform: Interfluves on uplands
Slope: 1 to 3 percent
Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

Wagstaff
Extent: About 5 percent of the unit
Landform: Interfluves on uplands
Slope: 1 to 3 percent

Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

General Considerations

- Most areas of this soil are cultivated. This soil is well suited to all crops commonly grown in the Hillsdale watershed. Erosion is a serious hazard, and it can be controlled by terracess, contour farming or conservation tillage. This soil has good potential for hay or tame grasses. The high clay content limits the suitability of this soil for many engineering uses.

8101—Hepler silt loam, occasionally flooded

Map Unit Composition

Hepler: 90 percent
Minor components: 10 percent

Component Descriptions

Hepler
MLRA: 112—Cherokee Prairies
Landform: Flood plains in valleys
Hillslopes position: Toeslopes
Parent material: Fine-silty alluvium
Slope: 0 to 2 percent
Drainage class: Somewhat poorly drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: High (about 11.6 inches)
Shrink-swell potential: Moderate (about 4.9 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: About 12 to 17 inches
Surface runoff class: Low
Ecological site: Loamy Lowland (pe35-42)
Land capability (nonirrigated): 2w

Typical Profile:
Ap—0 to 9 inches; silt loam
E—9 to 25 inches; silt loam
Bt—25 to 40 inches; silty clay loam
BC—40 to 60 inches; silty clay loam

Minor Components

Mason
Extent: About 10 percent of the unit
Landform: Flood plains on uplands
Slope: 0 to 2 percent
Drainage class: Well drained
Ecological site: Loamy Lowland (pe35-42)

General Considerations

- Most areas of this soil are cultivated. Some areas are pasture or trees. It is well suited to all crops grown in the watershed. Erosion is a serious hazard that can be controlled by conservation tillage or no-till. This soil is well suited for hay land and pasture. Flooding and wetness limits the suitability of this soil for many engineering uses.

8301—Verdigris silt loam, frequently flooded

Map Unit Composition

Verdigris: 85 percent
Minor components: 15 percent

Component Descriptions

Verdigris
MLRA: 112—Cherokee Prairies
Landform: Flood plains in valleys
Parent material: Fine-silty alluvium
Slope: 0 to 2 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: High (about 12.0 inches)
Shrink-swell potential: Moderate (about 3.7 LEP)
Flooding hazard: Frequent
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Low
Ecological site: Loamy Lowland (pe35-42)
Land capability (nonirrigated): 5w

Typical Profile:
A1—0 to 9 inches; silt loam
A2—9 to 27 inches; silt loam
A3—27 to 32 inches; silt loam
AC—32 to 52 inches; silt loam
C—52 to 60 inches; silt loam

Summit
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 2 to 8 percent
Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

Osage
Extent: About 5 percent of the unit
Landform: Flood plains in valleys
Slope: 0 to 2 percent
Drainage class: Poorly drained
Ecological site: Clay Lowland (pe35-42)

General Considerations

- Most areas of this soil are pasture and trees. This soil is suited for pasture or trees. This soil is suited to tall fescue and reed canarygrass. Flooding limits the suitability of this soil for many engineering uses.

8302—Verdigris silt loam, occasionally flooded

Map Unit Composition

Verdigris: 90 percent
Minor components: 10 percent

Component Descriptions

Verdigris
MLRA: 112—Cherokee Prairies
Landform: Flood plains in valleys
Parent material: Fine-silty alluvium
Slope: 0 to 2 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: High (about 12.0 inches)
Shrink-swell potential: Moderate (about 3.7 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Low
Ecological site: Loamy Lowland (pe35-42)
Land capability (nonirrigated): 2w

Typical Profile:
A1—0 to 9 inches; silt loam
A2—9 to 27 inches; silt loam
A3—27 to 32 inches; silt loam
AC—32 to 52 inches; silt loam
C—52 to 60 inches; silt loam

Minor Components

Osage
Extent: About 10 percent of the unit
Landform: Flood plains in valleys
Slope: 0 to 2 percent
Drainage class: Poorly drained
Ecological site: Clay Lowland (pe35-42)

General Considerations

- Most areas of this soil are cultivated. Some areas are pasture or trees. It is well suited to all crops grown in the watershed. Erosion is a serious hazard that can be controlled by conservation tillage or no-till. This soil is well suited for hay land and pasture. Flooding and wetness limits the suitability of this soil for many engineering uses.

8390—Wynona silt loam, occasionally flooded

Map Unit Composition

Wynona: 85 percent
Minor components: 15 percent

Component Descriptions

Wynona
MLRA: 112—Cherokee Prairies
Landform: Flood plains in valleys
Parent material: Fine-silty alluvium
Slope: 0 to 2 percent
Drainage class: Poorly drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: High (about 11.4 inches)

Shrink-swell potential: High (about 6.2 LEP)
Flooding hazard: Occasional
Depth to seasonal zone of saturation: About 12 to 17 inches
Surface runoff class: Low
Ecological site: Loamy Lowland (pe35-42)
Land capability (nonirrigated): 3w

Typical Profile:
Ap—0 to 10 inches; silt loam
A—10 to 14 inches; silty clay loam
Bg—14 to 38 inches; silty clay loam
Cg—38 to 53 inches; silty clay loam
Ab—53 to 60 inches; silty clay loam

Minor Components

Osage
Extent: About 15 percent of the unit
Landform: Flood plains in valleys
Slope: 0 to 2 percent
Drainage class: Poorly drained
Ecological site: Clay Lowland (pe35-42)

General Considerations

- Most areas of this soil are cultivated. Some areas are pasture or trees. It is suited to all crops grown in the watershed. Erosion is a serious hazard that can be controlled by conservation tillage or no-till. This soil is well suited for hay land and pasture. Flooding and wetness limits the suitability of this soil for many engineering uses.

8501—Mason silt loam, rarely flooded

Map Unit Composition

Mason: 85 percent
Minor components: 15 percent

Component Descriptions

Mason
MLRA: 112—Cherokee Prairies
Landform: Stream terraces in valleys
Parent material: Fine-silty alluvium
Slope: 0 to 2 percent
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.20 inch per hour)
Available water capacity: High (about 10.6 inches)
Shrink-swell potential: Moderate (about 4.7 LEP)
Flooding hazard: Rare
Ponding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Medium
Ecological site: Loamy Lowland (pe35-42)
Land capability (nonirrigated): 1

Typical Profile:
Ap—0 to 8 inches; silt loam

AB—8 to 18 inches; silt loam
Bt—18 to 41 inches; silty clay loam
BC—41 to 60 inches; silty clay loam

Minor Components

Hepler
Extent: About 5 percent of the unit
Landform: Flood plains in valleys
Slope: 0 to 2 percent
Drainage class: Somewhat poorly drained
Ecological site: Loamy Lowland (pe35-42)

Osage
Extent: About 5 percent of the unit
Landform: Flood plains in valleys
Slope: 0 to 2 percent
Drainage class: Poorly drained
Ecological site: Clay Lowland (pe35-42)

Verdigris
Extent: About 5 percent of the unit
Landform: Flood plains in valleys
Slope: 0 to 2 percent
Drainage class: Moderately well drained
Ecological site: Loamy Lowland (pe35-42)

General Considerations

- Most areas this soil are cultivated. This soil is well suited to cultivated crops, hay, and pasture. Erosion is a serious hazard that can be controlled by conservation tillage or no-till. Flooding limits the suitability of this soil for many engineering uses.

8640—Bucyrus silt loam, 1 to 3 percent slopes

Map Unit Composition

Bucyrus: 85 percent
Minor components: 15 percent

Component Descriptions

Bucyrus
MLRA: 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Shoulders and summits
Parent material: Fine-silty loess over silty and clayey residuum derived from limestone and shale
Slope: 1 to 3 percent
Depth to restrictive feature: More than 60 inches to bedrock
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: High (about 10.4 inches)
Shrink-swell potential: Very high (about 9.7 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Medium

Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 2e

Typical Profile:
Ap—0 to 8 inches; silt loam
A—8 to 16 inches; silty clay loam
BA—16 to 22 inches; silty clay loam
Bt1—22 to 32 inches; silty clay
Bt2—32 to 52 inches; silty clay
Bt3—52 to 71 inches; silty clay
R—71 to 75 inches; weathered bedrock

Minor Components

Eram
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 1 to 4 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

Shidler
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 1 to 4 percent
Depth to restrictive feature: 4 to 20 inches to bedrock (lithic)
Drainage class: Well drained
Ecological site: Shallow Sandstone (pe35-42)

Wagstaff
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 1 to 4 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

General Considerations

- Most areas of this soil are cultivated. This soil is well suited to all crops commonly grown in the watershed. Erosion is a serious hazard that can be controlled by terracess, contour farming, or conservation tillage. This soil has good potential for hay or tame grasses. The high clay content limits the suitability of this soil for many engineering uses.

8641—Bucyrus silty clay loam, 3 to 8 percent slopes

Map Unit Composition

Bucyrus: 85 percent
Minor components: 15 percent

Component Descriptions

Bucyrus
MLRA: 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Backslopes

Parent material: Fine-silty loess over silty and clayey residuum derived from limestone and shale
Slope: 3 to 8 percent
Depth to restrictive feature: More than 60 inches to bedrock
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: High (about 10.2 inches)
Shrink-swell potential: Very high (about 9.7 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: High
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 6 inches; silty clay loam
BA—6 to 17 inches; silty clay loam
Bt1—17 to 32 inches; silty clay
Bt2—32 to 52 inches; silty clay
Bt3—52 to 71 inches; silty clay
R—71 to 75 inches; weathered bedrock

Minor Components

Eram
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 4 to 8 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

Shidler
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 4 to 8 percent
Depth to restrictive feature: 4 to 20 inches to bedrock (lithic)
Drainage class: Well drained
Ecological site: Shallow Sandstone (pe35-42)

General Considerations

- Most areas of this soil are cultivated. This soil is suited to all crops commonly grown in the watershed. Erosion is a serious hazard, that can be controlled by terracess, contour farming, or conservation tillage. This soil has good potential for hay, tame grasses, and trees. The high clay content limits the suitability of this soil for many engineering uses.

8663—Clareson-Rock outcrop complex, 3 to 15 percent slopes

Map Unit Composition

Clareson: 60 percent
Rock outcrop: 20 percent
Minor components: 20 percent

Component Descriptions

Clareson
MLRA: 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Shoulders and backslopes
Parent material: Clayey residuum derived from limestone
Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: Very low (about 2.5 inches)
Shrink-swell potential: High (about 6.6 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Very high
Ecological site: Shallow Flats (pe35-42)
Land capability (nonirrigated): 6e

Typical Profile:
A—0 to 7 inches; silty clay loam
BA—7 to 15 inches; silty clay loam
Bt—15 to 26 inches; very flaggy silty clay loam
R—26 to 30 inches; unweathered bedrock

Rock outcrop
MLRA: 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Shoulders and backslopes
Parent material: Residuum derived from limestone
Slope: 2 to 15 percent
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: High
Land capability (nonirrigated): 8s

Minor Components

Eram
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 2 to 15 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

Lebo
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 2 to 15 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Well drained
Ecological site: Loamy Upland (pe35-42)

Summit
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 2 to 15 percent

Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

Wagstaff
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 2 to 15 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

General Considerations

- Most areas of this map unit are rangeland. They are suited to rangeland. The major concerns of management are erosion and low available water holding capacity. The depth to bedrock and large stones limits the suitability of this map unit for many engineering uses.

8789—Lebo channery silty clay loam, 15 to 30 percent slopes

Map Unit Composition

Lebo: 85 percent
Minor components: 15 percent

Component Descriptions

Lebo
MLRA: 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Backslopes
Parent material: Skeletal loamy residuum derived from sandstone and shale
Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately high (about 0.60 inch per hour)
Available water capacity: Low (about 4.0 inches)
Shrink-swell potential: Moderate (about 4.7 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: High
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 6e

Typical Profile:
A—0 to 11 inches; channery silty clay loam
Bw—11 to 18 inches; channery silty clay loam
BC—18 to 28 inches; channery silty clay loam
C—28 to 38 inches; extremely channery silty clay loam
Cr—38 to 42 inches; weathered bedrock

Minor Components

Clareson
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 15 to 30 percent

Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Well drained
Ecological site: Shallow Flats (pe35-42)

Eram
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

Wagstaff
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

General Considerations

- Most areas of this soil are rangeland. Some areas are pasture or trees. This soil is suited to rangeland, hayland, or pasture. Erosion is a serious hazard that can be controlled by adequate vegetative cover. The depth to bedrock and slope limits the suitability of this soil for many engineering uses.

8911—Summit silty clay loam, 1 to 3 percent slopes

Map Unit Composition

Summit: 85 percent
Minor components: 15 percent

Component Descriptions

Summit
MLRA: 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Backslopes and footslopes
Parent material: Silty and clayey residuum derived from acid shale
Slope: 1 to 3 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Low
Available water capacity: Moderate (about 8.2 inches)
Shrink-swell potential: Very high (about 10.9 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 21 to 26 inches
Surface runoff class: High
Ecological site: Clay Upland (pe35-42)
Land capability (nonirrigated): 2e

Typical Profile:
Ap—0 to 11 inches; silty clay loam
BA—11 to 24 inches; silty clay
Bt—24 to 42 inches; silty clay
BC—42 to 60 inches; silty clay

Minor Components

Kenoma
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 1 to 4 percent
Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

Wagstaff
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 1 to 3 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

General Considerations

- Most areas of this soil are cultivated. It is well suited to all crops commonly grown in the watershed. Erosion is a serious hazard that can be controlled by terracess, contour farming, or conservation tillage. This soil has good potential for hay, tame grasses, and trees. The wetness limits the suitability of this soil for many engineering uses.

8912—Summit silty clay loam, 3 to 7 percent slopes

Map Unit Composition

Summit: 85 percent
Minor components: 15 percent

Component Descriptions

Summit
MLRA: 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Backslopes
Parent material: Silty and clayey residuum derived from acid shale
Slope: 3 to 7 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Low
Available water capacity: Moderate (about 8.2 inches)
Shrink-swell potential: Very high (about 10.9 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 21 to 26 inches
Surface runoff class: Very high
Ecological site: Clay Upland (pe35-42)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 11 inches; silty clay loam
BA—11 to 24 inches; silty clay
Bt—24 to 42 inches; silty clay
BC—42 to 60 inches; silty clay

Minor Components

Dennis
Extent: about 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 4 to 8 percent
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

Shidler
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 4 to 8 percent
Depth to restrictive feature: 4 to 20 inches to bedrock (lithic)
Drainage class: Well drained
Ecological site: Shallow Sandstone (pe35-42)

Wagstaff
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 4 to 8 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

General Considerations

- Most areas of this soil are pasture. This soil is suited for tall fescue and bromegrass. Some small areas are cultivated. Erosion is a serious hazard that can be controlled by terracess, contour farming, or conservation tillage. This soil has good potential for hay, tame grasses, and trees. The wetness limits the suitability of this soil for many engineering uses.

8953—Wagstaff silt loam, 1 to 3 percent slopes

Map Unit Composition

Wagstaff: 85 percent
Minor components: 15 percent

Component Descriptions

Wagstaff
MLRA: 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Shoulders and summits
Parent material: Silty and clayey residuum derived from limestone and shale
Slope: 1 to 3 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: Low (about 5.5 inches)
Shrink-swell potential: Very high (about 11.7 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: High
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 7 inches; silt loam
A—7 to 14 inches; silty clay loam
BA—14 to 18 inches; silty clay loam
Bt1—18 to 24 inches; silty clay
Bt2—24 to 33 inches; silty clay
R—33 to 37 inches; weathered bedrock

Minor Components

Bucyrus
Extent: About 10 percent of the unit
Landform: Interfluves on uplands
Slope: 1 to 3 percent
Depth to restrictive feature: More than 60 inches to bedrock
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

Summit
Extent: About 5 percent of the unit
Landform: Interfluves on uplands
Slope: 1 to 3 percent
Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

General Considerations

- Most areas of this soil are cultivated or in pasture. Erosion is a serious hazard that can be controlled by conservation tillage, contour farming, or terracess. This soil is well suited to pasture and hayground. The high clay content and depth to bedrock limits the suitability of this soil for many engineering uses.

8955—Wagstaff silty clay loam, 3 to 7 percent slopes

Map Unit Composition

Wagstaff: 85 percent
Minor components: 15 percent

Component Descriptions

Wagstaff
MLRA: 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Backslopes
Parent material: Silty and clayey residuum derived from limestone and shale
Slope: 3 to7 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: Low (about 5.5 inches)
Shrink-swell potential: Very high (about 11.7 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: High
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 7 inches; silty clay loam
A—7 to 14 inches; silty clay loam
BA—14 to 18 inches; silty clay loam
Bt1—18 to 24 inches; silty clay
Bt2—24 to 33 inches; silty clay
R—33 to 37 inches; weathered bedrock

Minor Components

Shidler
Extent: About 15 percent of the unit
Landform: Hillslopes on uplands
Slope: 4 to 8 percent
Depth to restrictive feature: 4 to 20 inches to bedrock (lithic)
Drainage class: Well drained
Ecological site: Shallow Sandstone (pe35-42)

General Considerations

- Most areas of this soil are cultivated. It is suited to most crops commonly grown in the watershed. Erosion is a serious hazard that can be controlled by contour farming or conservation tillage. This soil is well suited for hay, tame grasses, and trees. The high clay content and the depth to bedrock limits the suitability of this soil for many engineering uses.

8957—Wagstaff-Summit complex, 3 to 7 percent slopes

Map Unit Composition

Wagstaff: 45 percent
Summit: 35 percent
Minor components: 20 percent

Component Descriptions

Wagstaff
MLRA: 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Backslopes
Parent material: Silty and clayey residuum derived from limestone and shale
Slope: 3 to 7 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (lithic)
Drainage class: Well drained
Slowest saturated hydraulic conductivity: Moderately low (about 0.06 inch per hour)
Available water capacity: Low (about 5.5 inches)
Shrink-swell potential: Very high (about 11.7 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: More than 6 feet
Surface runoff class: Very high
Ecological site: Loamy Upland (pe35-42)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 7 inches; silty clay loam
A—7 to 14 inches; silty clay loam
BA—14 to 18 inches; silty clay loam
Bt1—18 to 24 inches; silty clay

Bt2—24 to 33 inches; silty clay
R—33 to 37 inches; weathered bedrock

Summit
MLRA: 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Backslopes
Parent material: Silty and clayey residuum derived from acid shale
Slope: 3 to 7 percent
Drainage class: Moderately well drained
Slowest saturated hydraulic conductivity: Low
Available water capacity: Moderate (about 8.2 inches)
Shrink-swell potential: Very high (about 10.9 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 21 to 26 inches
Surface runoff class: Very high
Ecological site: Clay Upland (pe35-42)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 11 inches; silty clay loam
BA—11 to 24 inches; silty clay
Bt—24 to 42 inches; silty clay
BC—42 to 60 inches; silty clay

Minor Components

Bucyrus
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 4 to 8 percent
Depth to restrictive feature: More than 60 inches to bedrock
Drainage class: Moderately well drained
Ecological site: Loamy Upland (pe35-42)

Eram
Extent: About 10 percent of the unit
Landform: Interfluves on hills
Slope: 4 to 8 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

General Considerations

- Most areas of these soils are cropland and pasture. These soils are poorly suited for cropland. The available water holding capacity of the Wagstaff soil is low and the Summit soil is high. Erosion is a serious hazard that can be controlled by conservation tillage, contour farming, or waterways. The depth to bedrock limits the suitability of these soils for many engineering uses.

8962—Woodson silt loam, 1 to 3 percent slopes

Map Unit Composition

Woodson: 85 percent
Minor components: 15 percent

Component Descriptions

Woodson
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Hillslopes on uplands
Hillslopes position: Summits
Parent material: Silty and clayey alluvium
Slope: 1 to 3 percent
Drainage class: Somewhat poorly drained
Slowest saturated hydraulic conductivity: Low
Available water capacity: High (about 9.4 inches)
Shrink-swell potential: Very high (about 10.4 LEP)
Flooding hazard: None
Depth to seasonal zone of saturation: About 12 to 17 inches
Surface runoff class: Medium
Ecological site: Clay Upland (pe35-42)
Land capability (nonirrigated): 3e

Typical Profile:
Ap—0 to 7 inches; silt loam
A—7 to 12 inches; silt loam
Bt—12 to 30 inches; silty clay
BC—30 to 43 inches; silty clay
C—43 to 60 inches; silty clay loam

Minor Components

Kenoma
Extent: About 10 percent of the unit
Landform: Hillslopes on uplands
Slope: 1 to 4 percent
Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

Summit
Extent: About 5 percent of the unit
Landform: Hillslopes on uplands
Slope: 1 to 3 percent
Drainage class: Moderately well drained
Ecological site: Clay Upland (pe35-42)

General Considerations

- Most areas of this soil are cultivated. This soil is suited to most crops grown in the watershed. Wetness and seasonal droughtiness can limit crops in some years. Erosion is a slight hazard that can be controlled by conservation tillage or no-tills. This soil is well suited to tame grasses. The wetness limits the suitability of this soil for engineering uses.

9967—Landfill

Component Description

- This map unit has been used as a landfill for several years. It is an area of accumulated waste products of human habitation that can be above or below natural ground level. This area is poorly suited for cropland and most engineering practices.

9971—Arents, earthen dam

Component Description

- This map unit consists of barriers constructed to control the flow or raise the level of water. The dams are typically constructed with earthen material. They may be covered with earthy material or armored with concrete or rock.

9982—Fluvents, frequently flooded

Map Unit Composition

Fluvents: 100 percent

Component Descriptions

Fluvents
MLRA: 106—Nebraska and Kansas Loess-Drift Hills and 112—Cherokee Prairies
Landform: Flood plains in valleys
Parent material: Fine-silty alluvium
Flooding hazard: Frequent
Depth to seasonal zone of saturation: About 33 to 38 inches
Land capability (nonirrigated): 6w

General Considerations

- Most areas of this soil are cultivated. This soil is suited to all major crops commonly grown in the valley. This soil has god potential for hay or tame grasses. Flooding limits the suitability of this soil for many engineering uses.

9983—Gravel pits and quarries

Component Description

- Pits are open excavations from which soil and commonly underlying material have been removed, exposing either rock or other material. Kinds include Pits, mine; Pits, gravel; and Pits, quarry. Commonly, pits are closely associated with Dumps.

9984—Made land

Component Description

- This map unit consists of areas disturbed by highway construction. Much of the surface area is overlain by asphalt and concrete.

9986—Miscellaneous water

Component Description

- Miscellaneous water includes small manmade water areas used for industrial, sanitary, or mining applications that contain water most of the year.

9991—Orthents, shallow

Component Description

- Orthents consist of areas from which the topsoil has been removed. The exposed areas of limestone and shale range from 3 to 30 acres in size. These soils support some grasses and trees and are of lower productivity.

9993—Pits

Component Description

- This map unit consists of an open excavation from which soil and, commonly, underlying material have been removed. Rock or other material exposed in the excavation.

9999—Water

Component Description

- Water includes streams, lakes, ponds, and estuaries. These areas are covered with water in most years, at least during the period that is warm enough for plants to grow. Many areas are covered with water throughout the year.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; for agricultural waste management; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited, somewhat limited,* and *very limited*. The suitability ratings are expressed as *well suited, moderately suited, poorly suited,* and *unsuited* or as *good, fair,* and *poor*, and *very poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate

gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is

maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

The acreage of soils in each capability class or subclass is shown in table 4. The capability classification of map units in this survey area is given in the section "Detailed Soil Map Units" and in the yields table.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food,

feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 6. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table A. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading “Detailed Soil Map Units.”

Rangeland

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Table 7 shows, for each soil that supports rangeland vegetation, the ecological site and the potential annual production of vegetation in favorable, normal, and unfavorable years. An explanation of the column headings in the table follows.

An *ecological site* is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time throughout the soil development process; a characteristic hydrology, particularly infiltration and runoff, that has developed over time; and a characteristic plant community (kind and amount of vegetation). The hydrology of a site is influenced by development of the soil and plant community. The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production. Descriptions of ecological sites are provided in the Field Office Technical Guide, which is available in local offices of the Natural Resources Conservation Service.

Total dry-weight production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year’s growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and

unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture. Yields are adjusted to a common percent of air-dry moisture content.

Characteristic vegetation—the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil—is listed by common name. Under *rangeland composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range similarity index and rangeland trend. Range similarity index is determined by comparing the present plant community with the potential natural plant community on a particular rangeland ecological site. The more closely the existing community resembles the potential community, the higher the range similarity index. Rangeland trend is defined as the direction of change in an existing plant community relative to the potential natural plant community. Further information about the range similarity index and rangeland trend is available in chapter 4 of the "National Range and Pasture Handbook" (http://www.ftw.nrcs.usda.gov/glti/NRPH.html).

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, control of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, an area with a range similarity index somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Forest Productivity and Management

The tables in this section can help forest owners or managers plan the use of soils for wood crops. They show the potential productivity of the soils for wood crops and rate the soils according to the limitations that affect various aspects of forest management.

Forest Productivity

In table 8, the *potential productivity* of merchantable or *common trees* on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

The *volume of wood fiber*, a number, is the yield likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Trees to manage are those that are preferred for planting, seeding, or natural regeneration and those that remain in the stand after thinning or partial harvest.

Forest Management

In tables 9a, 9b, 9c, 9d, and 9e, interpretive ratings are given for various aspects of forest management. The ratings are both verbal and numerical.

Some rating class terms indicate the degree to which the soils are suited to a specified forest management practice. *Well suited* indicates that the soil has features that are favorable for the specified practice and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified practice. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified practice. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified practice or that extreme measures are needed to overcome the undesirable soil properties.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified forest management practice (1.00) and the point at which the soil feature is not a limitation (0.00).

Rating class terms for fire damage and seedling mortality are expressed as *low, moderate,* and *high*. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for fire damage or seedling mortality is highest (1.00) and the point at which the potential is lowest (0.00).

The paragraphs that follow indicate the soil properties considered in rating the soils for forest management practices. More detailed information about the criteria used in the ratings is available in the “National Forestry Manual,” which is available in local offices of the Natural Resources Conservation Service or on the Internet (http://nsscnt.nssc.nrcs.usda.gov/nfm/).

For *limitations affecting construction of haul roads and log landings*, the ratings are based on slope, flooding, permafrost, plasticity index, the hazard of soil slippage, content of sand, the Unified classification, rock fragments on or below the surface, depth to a restrictive layer that is indurated, depth to a water table, and ponding. The limitations are described as slight, moderate, or severe. A rating of *slight* indicates that no significant limitations affect construction activities, *moderate* indicates that one or more limitations can cause some difficulty in construction, and *severe* indicates that one or more limitations can make construction very difficult or very costly.

The ratings of *suitability for log landings* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The soils are described as well suited, moderately suited, or poorly suited to use as log landings.

Ratings in the column *soil rutting hazard* are based on depth to a water table, rock fragments on or below the surface, the Unified classification, depth to a restrictive layer, and slope. Ruts form as a result of the operation of forest equipment. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that the soil is subject to little or no rutting, *moderate* indicates that rutting is likely, and *severe* indicates that ruts form readily.

Ratings in the column *hazard of off-road or off-trail erosion* are based on slope and on soil erodibility factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance. The hazard is described as slight, moderate, severe, or very severe. A rating of *slight* indicates that erosion is unlikely under ordinary climatic conditions; *moderate* indicates that some erosion is likely and

that erosion-control measures may be needed; *severe* indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and *very severe* indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Ratings in the column *hazard of erosion on roads and trails* are based on the soil erodibility factor K, slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that little or no erosion is likely; *moderate* indicates that some erosion is likely, that the roads or trails may require occasional maintenance; and that simple erosion-control measures are needed; and *severe* indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Ratings in the column *suitability for roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads. The soils are described as well suited, moderately suited, or poorly suited to this use.

Ratings in the columns *suitability for hand planting* and *suitability for mechanical planting* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, moderately suited, poorly suited, or unsuited to these methods of planting. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *suitability for use of harvesting equipment* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, and ponding. The soils are described as well suited, moderately suited, or poorly suited to this use.

Ratings in the column *suitability for mechanical site preparation (surface)* are based on slope, depth to a restrictive layer, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 1 foot is considered in the ratings.

Ratings in the column *suitability for mechanical site preparation (deep)* are based on slope, depth to a restrictive layer, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 3 feet is considered in the ratings.

Ratings in the column *potential for damage to soil by fire* are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope. The soils are described as having a low, moderate, or high potential for this kind of damage. The ratings indicate an evaluation of the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer.

Ratings in the column *potential for seedling mortality* are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. The soils are described as having a low, moderate, or high potential for seedling mortality.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, yards, fruit trees, gardens, and cropland from wind and snow; help to keep snow on fields; and provide food and cover for

wildlife. Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 10 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in the table are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service or of the Cooperative Extension Service or from a commercial nursery.

Recreation

The soils of the survey area are rated in tables 11a and 11b according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the tables are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in tables 11a and 11b can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting

the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Off-road motorcycle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate

vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 12, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are mountainmahogany, bitterbrush, snowberry, and big sagebrush.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties

and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous and/or coniferous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include antelope, deer, sage grouse, meadowlark, and lark bunting.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the data in the tables described under the heading “Soil Properties.”

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential,

available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Tables 13a and 13b show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

Tables 14a and 14b show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The

limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the

movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Agricultural Waste Management

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

Tables 15a, 15b, and 15c show the degree and kind of soil limitations affecting the treatment of agricultural waste, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste

stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of these tables, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 milligrams per liter. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 milligrams per liter. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the tables are for waste management systems that not only dispose of and treat organic waste or wastewater but also are beneficial to crops (application of manure and food-processing waste, application of sewage sludge, and disposal of wastewater by irrigation) and for waste management systems that are designed only for the purpose of wastewater disposal and treatment (overland flow of wastewater, rapid infiltration of wastewater, and slow rate treatment of wastewater).

Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Application of manure and food-processing waste not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are either solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings. The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a

water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

Application of sewage sludge not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. In the context of this table, sewage sludge is the residual product of the treatment of municipal sewage. The solid component consists mainly of cell mass, primarily bacteria cells that developed during secondary treatment and have incorporated soluble organics into their own bodies. The sludge has small amounts of sand, silt, and other solid debris. The content of nitrogen varies. Some sludge has constituents that are toxic to plants or hazardous to the food chain, such as heavy metals and exotic organic compounds, and should be analyzed chemically prior to use.

The content of water in the sludge ranges from about 98 percent to less than 40 percent. The sludge is considered liquid if it is more than about 90 percent water, slurry if it is about 50 to 90 percent water, and solid if it is less than about 50 percent water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the sludge is applied, and the method by which the sludge is applied. The properties that affect absorption, plant growth, and microbial activity include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, available water capacity, reaction, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of sludge. Permanently frozen soils are unsuitable for waste treatment.

Disposal of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also can improve crop production by increasing the amount of water available to crops. The ratings in the table are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock or a cemented pan, depth to a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a soil to adsorb heavy metals. Permanently frozen soils are not suitable for disposal of wastewater by irrigation.

Overland flow of wastewater is a process in which wastewater is applied to the upper reaches of sloped land and allowed to flow across vegetated surfaces, sometimes called terraces, to runoff-collection ditches. The length of the run generally is 150 to 300 feet. The application rate ranges from 2.5 to 16.0 inches per week. It commonly exceeds the rate needed for irrigation of cropland. The wastewater leaves solids and nutrients on the vegetated surfaces as it flows downslope in a thin film. Most of the water reaches the collection ditch, some is lost through evapotranspiration, and a small amount may percolate to the ground water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, and the design and construction of the system. Reaction and the cation-exchange capacity affect absorption. Reaction, salinity, and the sodium adsorption ratio affect plant growth and microbial activity. Slope, permeability, depth to a water table, ponding, flooding, depth to bedrock or a cemented pan, stones, and cobbles affect design and construction. Permanently frozen soils are unsuitable for waste treatment.

Rapid infiltration of wastewater is a process in which wastewater applied in a level basin at a rate of 4 to 120 inches per week percolates through the soil. The wastewater may eventually reach the ground water. The application rate commonly exceeds the rate needed for irrigation of cropland. Vegetation is not a necessary part of the treatment; hence, the basins may or may not be vegetated. The thickness of the soil material needed for proper treatment of the wastewater is more than 72 inches. As a result, geologic and hydrologic investigation is needed to ensure proper design and performance and to determine the risk of ground-water pollution.

The ratings in the table are based on the soil properties that affect the risk of pollution and the design, construction, and performance of the system. Depth to a water table, ponding, flooding, and depth to bedrock or a cemented pan affect the risk of pollution and the design and construction of the system. Slope, stones, and cobbles also affect design and construction. Permeability and reaction affect performance. Permanently frozen soils are unsuitable for waste treatment.

Slow rate treatment of wastewater is a process in which wastewater is applied to land at a rate normally between 0.5 inch and 4.0 inches per week. The application rate commonly exceeds the rate needed for irrigation of cropland. The applied wastewater is treated as it moves through the soil. Much of the treated water may percolate to the ground water, and some enters the atmosphere through evapotranspiration. The applied water generally is not allowed to run off the surface. Waterlogging is prevented either through control of the application rate or through the use of tile drains, or both.

The ratings in the table are based on the soil properties that affect absorption, plant growth microbial activity, erodibility, and the application of waste. The properties that affect absorption include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, depth to bedrock or a cemented pan, reaction, the cation-exchange capacity, and slope. Reaction, the sodium adsorption ratio, salinity, and bulk density affect plant growth and microbial activity. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

Construction Materials

Tables 16a and 16b give information about the soils as potential sources of gravel, sand, reclamation material, roadfill, and topsoil. Normal compaction, minor processing, and other standard construction practices are assumed.

Gravel and *sand* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 16a, only the likelihood of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains gravel or sand, the soil is considered a likely source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

The soils are rated *good, fair,* or *poor* as potential sources of gravel and sand. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of gravel or sand. The number 0.00 indicates that the layer is a poor source. The number 1.00 indicates that

the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

The soils are rated *good, fair,* or *poor* as potential sources of topsoil, reclamation material, and roadfill. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of reclamation material, roadfill, or topsoil. The lower the number, the greater the limitation.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 17 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good

performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Index Properties

Table 18 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 2). “Loam,” for

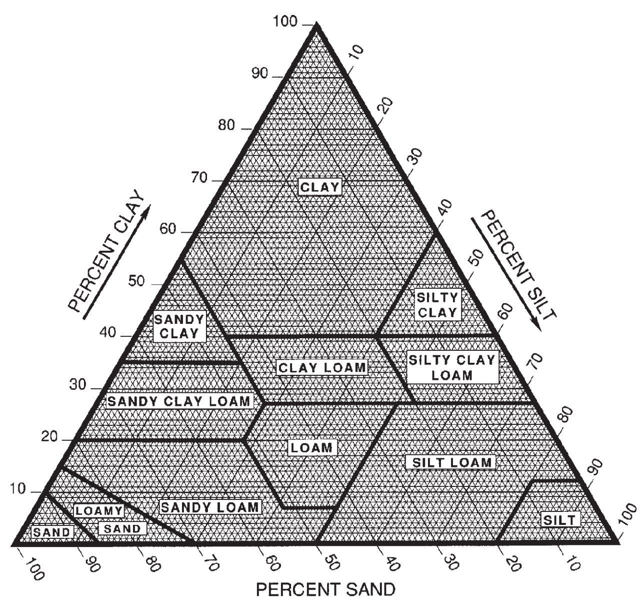


Figure 2.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2001) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2000).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

Physical Properties

Table 19 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as

classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In the table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In the table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In the table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^{1}/_{3}$- or $^{1}/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability (K_{sat}) refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in table 19 as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

Descriptions of these groups are available in the “National Soil Survey Handbook” (USDA, 2003).

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Properties

Table 20 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable bases plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Soil Features

Table 21 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness of the restrictive layer, which significantly affects the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Water Features

Table 22 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. Table 22 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Table 22 indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1998 and 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 23 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udolls (*ud*, meaning humid, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludolls (*Hapl*, meaning minimal horizonation, plus *udolls*, the suborder of the Mollisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. An example is Fluventic Hapludolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-silty, mixed, superactive mesic Fluventic Hapludolls.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows

standards in the “Soil Survey Manual” (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (Soil Survey Staff, 1999) and in “Keys to Soil Taxonomy” (Soil Survey Staff, 1998). Following the pedon description is the range of important characteristics of the soils in the series.

Arisburg Series

The Arisburg series consists of very deep, somewhat poorly drained soils formed in loess on uplands. Slopes range from 1 to 14 percent. The mean annual temperature is about 55 degrees F, and the mean annual precipitation is about 36 inches.

Taxonomic classification: Fine, smectitic, mesic Aquertic Argiudolls

Typical Pedon

Arisburg silt loam, on the summit of a ridge on a 2 percent slope in CRP in Cooper County, Missouri; about 6 miles west of Boonville; 700 feet east and 2,300 feet south of the northwest corner of sec. 13, T. 48 N., R. 18 W.; USGS Billingsville topographic quadrangle; lat. 38 degrees 55 minutes 43 seconds N. and long. 92 degrees 50 minutes 52 seconds W. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 6 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; many very fine roots; neutral; abrupt smooth boundary.

A—6 to 13 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine subangular blocky structure; friable; common very fine roots; few fine iron and manganese oxide accumulations; neutral; clear smooth boundary.

Bt—13 to 19 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate very fine subangular blocky structure; firm; few very fine roots; few distinct clay films on faces of peds; many prominent organic coatings; few fine iron and manganese oxide accumulations; slightly acid; gradual smooth boundary.

Btg1—19 to 26 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate fine subangular blocky structure; very firm; few very fine roots; common distinct clay films on faces of peds; few fine prominent dark yellowish brown (10YR 4/6) masses of iron accumulation in ped interiors; few fine iron and manganese oxide accumulations; common distinct organic coatings; moderately acid; gradual smooth boundary.

Btg2—26 to 36 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate fine subangular blocky structure; firm; few very fine roots; many distinct clay films on faces of peds; many fine prominent dark yellowish brown (10YR 4/6) masses of iron accumulation and few fine faint grayish brown (10YR 5/2) iron depletions in ped interiors; few fine iron and manganese oxide accumulations; slightly acid; gradual smooth boundary.

Btg3—36 to 47 inches; grayish brown (2.5Y 5/2) silty clay loam; weak fine subangular blocky structure; firm; few very fine roots; common distinct clay films on faces of peds; many fine prominent yellowish brown (10YR 5/8) iron masses in ped interiors; few fine iron and manganese oxide accumulations; slightly acid; gradual smooth boundary.

Btg4—47 to 56 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium subangular blocky structure; firm; few very fine roots; few distinct clay films on faces of peds; common fine prominent yellowish brown (10YR 5/8) and strong brown (7.5YR 5/8) masses of iron accumulation in ped interiors; few fine iron and manganese oxide accumulations; slightly acid; gradual smooth boundary.

Cg—56 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; firm; few very

fine roots; few distinct clay films in root channels; common fine prominent yellowish brown (10YR 5/8) masses of iron accumulation in ped interiors; few fine iron and manganese oxide accumulations; slightly acid.

Range in Characteristics

Base of the argillic horizon: 40 to 60 inches or more
Thickness of mollic epipedon: 10 to 20 inches; may include the upper part of the Bt horizon
Content of sand in the particle-size control section (weighted average): Less than 5 percent
Content of clay in the particle-size control section (weighted average): 35 to 42 percent; individual horizons may exceed 42 percent

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam or silty clay loam
Reaction—moderately acid to neutral

Bt horizon:
Hue—10YR or 2.5Y
Value—2 to 6
Chroma—2 to 6
Texture—silty clay loam or silty clay
Reaction—very strongly acid to slightly acid

Btg horizon:
Hue—10YR to 5Y
Value—4 to 6
Chroma—1 to 6
Texture—silty clay loam or silty clay
Reaction—very strongly acid to slightly acid

Cg horizon and BCg horizon (if it occurs):
Hue—10YR to 5Y
Calue—4 to 6
Chroma—1 to 6
Texture—silty clay loam or silt loam
Reaction—moderately acid to neutral

Belvue Series

The Belvue series consists of very deep, well drained soils that formed in silty alluvium on the flood-plain steps. Slopes range from 0 to 12 percent. The mean annual temperature is about 55 degrees F, and the mean annual precipitation is about 36 inches.

Taxonomic classification: Coarse-silty, mixed, superactive, nonacid, mesic Typic Udifluvents

Typical Pedon

Belvue silt loam, in a cultivated field in Pottawatomie County, Kansas; about 2.5 miles east and 1 mile south of Belvue; 50 feet south and 1,100 feet west of the northeast corner of sec. 12, T. 10 S., R. 11 E.; USGS Belvue topographic quadrangle; lat. 39

degrees 12 minutes 07 seconds N. and long. 96 degrees 07 minutes 54 seconds W. (Colors are for dry soil unless otherwise indicated.)

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; neutral; abrupt smooth boundary.

C1—6 to 11 inches; brown (10YR 5/3) silt loam, light gray (10YR 7/2) dry; massive; soft, very friable, nonsticky and nonplastic; common fine roots; slightly alkaline; clear smooth boundary.

C2—11 to 24 inches; pale brown (10YR 6/3) very fine sandy loam stratified with lenses of fine sand, light gray (10YR 7/2) dry; massive; soft, very friable, nonsticky and nonplastic; common fine roots; slightly alkaline; clear smooth boundary.

C3—24 to 39 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; massive; soft, very friable, nonsticky and nonplastic; common fine roots; strong effervescence; moderately alkaline; clear smooth boundary.

C4—39 to 58 inches; brown (10YR 5/3) very fine sandy loam, pale brown (10YR 6/3) dry; massive; soft, very friable, nonsticky and nonplastic; few fine roots; strong effervescence; moderately alkaline; clear smooth boundary.

C5—58 to 80 inches; pale brown (10YR 6/3) silt loam, very pale brown (10YR 8/3) dry; massive; soft, very friable, nonsticky and nonplastic; strong effervescence; moderately alkaline.

Range in Characteristics

Soil moisture: The soil moisture control section is 10 to 40 inches below the surface.
Mean annual soil temperature: 52 to 55 degrees F
Depth to calcium carbonate: 20 to 60 inches
Particle-size control section (weighted average): 10 to 40 inches
Content of clay in the particle-size control section (weighted average): 5 to 18 percent
Content of sand in the particle-size control section (weighted average): 15 to 75 percent

A horizon:
Hue—10YR
Value—4 or 5 moist, 6 or 7 dry
Chroma—1 or 2
Texture—silt loam, very fine sandy loam, loam, or fine sandy loam
Content of clay—5 to 15 percent
Reaction—neutral or slightly alkaline

C horizon:
Hue—10YR
Value—4 to 6 moist, 5 to 8 dry
Chroma—2 to 4
Texture—silt loam, very fine sandy loam, or loam
Content of clay—5 to 18 percent
Calcium carbonate equivalent—0 to 5 percent
Reaction—slightly alkaline or moderately alkaline

Bendena Series

The Bendena series consists of shallow and very shallow, somewhat excessively drained soils that formed mainly in residuum derived from limestone. These soils are on uplands. Slopes range from 2 to 50 percent. The mean annual precipitation is about 36 inches, and the mean annual temperature is about 55 degrees F.

Taxonomic classification: Loamy, mixed, superactive, mesic Lithic Hapludolls

Typical Pedon

Bendena silt loam, in an area of rangeland in Doniphan County, Kansas; about 4 miles south and 1 mile east of Bendena, 1,020 feet south and 440 feet east of the northwest corner of sec. 26, T. 4 S., R. 20 E. (Colors are for moist soil unless otherwise indicated.)

A—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; many fine and very fine roots; few fragments of weathered limestone in the lower 5 inches comprise less than 15 percent of the soil volume; slightly effervescent; slightly alkaline; abrupt smooth boundary.

R—10 inches; indurated, level bedded, fractured, limestone bedrock. The upper part has dark colored soil in the cracks.

Range in Characteristics

Soil moisture regime: Udic
Depth to lithic contact: 4 to 20 inches to limestone bedrock
Thickness of the mollic epipedon: 4 to 20 inches
Other features: Some pedons do not contain free carbonates above the bedrock; some pedons have a thin Bw, AC, or C horizon; the limestone is more weathered and is highly fractured in some pedons.

A horizon:
Hue—7.5YR to 2.5Y
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 to 3
Texture—silty clay loam, loam, or clay loam
Content of clay—20 to 35 percent
Content of sand—less than 35 percent fine sand or coarser material
Reaction—slightly acid to moderately alkaline

Bismarckgrove Series

The Bismarckgrove series consists of very deep, moderately well drained soils that formed in silty alluvium. These soils are on flood-plain steps. Slopes range from 0 to 3 percent. The mean annual temperature is about 55 degrees F, and the mean annual precipitation is about 36 inches.

Taxonomic classification: Fine-silty, mixed, superactive, mesic Fluventic Hapludolls

Typical Pedon

Bismarckgrove silt loam, on a north-facing 1 percent slope in a cultivated field in Jefferson County, Kansas; about 0.3 mile south of Perry, Kansas; 2,400 feet east and 1,900 feet south of the northwest corner of sec. 26, T. 11 N., R. 18 E. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; neutral; abrupt smooth boundary.

A—7 to 20 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular structure; slightly hard, friable, sticky and plastic; neutral; clear smooth boundary.

Bw—20 to 29 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; slightly acid; clear smooth boundary.
C1—29 to 58 inches; light brownish gray (10YR 6/2) silt loam, very pale brown (10YR 8/2) dry; massive; soft, very friable, nonsticky and nonplastic; thin strata of sandier soil throughout; neutral; clear smooth boundary.
2C2—58 to 80 inches; pale brown (10YR 6/3) loamy fine sand, very pale brown (10YR 8/3) dry; single grain; loose, nonsticky and nonplastic; neutral.

Range in Characteristics

Soil moisture regime: Udic
Mean annual soil temperature: 53 to 55 degrees F
Depth to secondary calcium carbonate: 40 to 60 inches
Depth to the cambic horizon: 20 to 29 inches
Depth to redoximorphic concentrations: 40 to 60 inches
Depth to lithologic discontinuity with sandy textures: 45 to 60 inches
Particle-size control section (weighted average): 10 to 40 inches
Content of clay in the particle-size control section (weighted average): 18 to 35 percent
Thickness of the mollic epipedon: 10 to 23 inches

A horizon:
Hue—10YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—1 or 2
Texture—silt loam; silty clay loam, or loam
Content of clay—18 to 35 percent
Reaction—moderately acid to neutral

Bw horizon:
Hue—10YR
Value—3 or 4 moist, 5 or 6 dry
Chroma—2 to 4
Texture—silt loam, silty clay loam, or silty clay
Content of clay—25 to 35 percent
Reaction—moderately acid to slightly alkaline

C horizon:
Hue—10YR, 7.5YR, or 2.5Y
Value—4 to 6 moist, 5 to 8 dry
Chroma—2 or 3
Texture—silt loam or very fine sandy loam
Content of clay—10 to 27 percent
Calcium carbonate equivalent—0 to 5 percent
Reaction—neutral to moderately alkaline

2C horizon:
Hue—10YR, 7.5YR, or 2.5Y
Value—4 to 6 moist, 5 to 8 dry
Chroma—2 or 3
Texture—silt loam or very fine sandy loam; commonly strata of sandier material
Content of clay—5 to 18 percent
Calcium carbonate equivalent—0 to 5 percent
Reaction—neutral to moderately alkaline

Bourbonais Series

The Bourbonais series consists of very deep, somewhat excessively drained soils that formed in silty over sandy alluvium on flood plains. Slopes range from 0 to 3 percent. The mean annual temperature is about 53 degrees F, and the mean annual precipitation is about 33 inches.

Taxonomic classification: Coarse-silty over sandy or sandy-skeletal, mixed, superactive, mesic Fluventic Hapludolls

Typical Pedon

Bourbonais-Bismarckgrove complex, 0 to 3 percent slopes, rarely flooded, in a cultivated field in Jefferson County, Kansas; about 0.5 mile west and 1 mile south of Grantville; 1,300 feet north and 150 feet west of the northeast corner of sec. 25, T. 11 S., R. 16 E.; USGS Grantville topographic quadrangle; lat. 39 degrees 04 minutes 16 seconds N. and long. 95 degrees 34 minutes 50 seconds W. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; neutral; abrupt smooth boundary.

A—7 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine roots; neutral; clear smooth boundary.

C—12 to 34 inches; dark grayish brown (10YR 4/2) silt, light brownish gray (10YR 6/2) dry; massive; soft, very friable, nonsticky and nonplastic; common fine roots; neutral; clear smooth boundary.

2C1—34 to 60 inches; stratified grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) sandy loam, light gray (10YR 7/2) and very pale brown (10YR 8/2) dry; massive; loose, nonsticky and nonplastic; few fine and very fine roots; neutral; abrupt smooth boundary.

2C2—60 to 80 inches; stratified grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) sand, light gray (10YR 7/2) and very pale brown (10YR 8/2) dry; single grain; loose, nonsticky and nonplastic; very fine roots; slightly acid.

Range in Characteristics

Mean annual soil temperature: 52 to 55 degrees F
Depth to abrupt textural change: 20 to 40 inches
Particle-size control section (weighted average): 10 to 40 inches
Content of clay in the particle-size control section (weighted average): 5 to 18 percent

A horizon:
Hue—10YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—2 or 3
Texture—silt loam, very fine sandy loam, or loam
Content of clay—5 to 18 percent
Reaction—strongly acid to slightly alkaline

C horizon:
Hue—10YR
Value—4 or 5 moist, 6 or 7 dry
Chroma—2 to 4
Texture—silt loam, very fine sandy loam, or loam
Content of clay—5 to 18 percent
Reaction—strongly acid to slightly alkaline

2C horizon:
Hue—10YR
Value—4 to 6 moist, 6 to 8 dry
Chroma—2 to 4
Texture—sand, coarse sand, loamy sand, or loamy fine sand
Content of clay—0 to 7 percent
Reaction—strongly acid to slightly alkaline

Bucyrus Series

The Bucyrus series consists of very deep, moderately well drained soils that formed in loess over limestone residuum of Pennsylvanian age. These soils are on uplands. Slopes range from 1 to 8 percent. The mean annual air temperature is 59 degrees F, and the mean annual precipitation is 35 inches.

Taxonomic classification: Fine, smectitic, thermic Vertic Paleudolls

Typical Pedon

Bucyrus silt loam, 1 to 4 percent slopes, in a pasture in Miami County, Kansas; about 9 miles west and 4 miles north of Hillsdale; 600 feet south and 300 feet west of the northeast corner of sec. 30, T. 15 S., R. 22 E. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 8 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to weak fine granular; many fine roots; slightly hard, friable, slightly sticky and slightly plastic; neutral; clear smooth boundary.

A1—8 to 16 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine subangular blocky structure; many fine roots; slightly hard, friable, sticky and plastic; slightly acid; clear smooth boundary.

BA—16 to 22 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine and medium subangular blocky structure; many fine roots; slightly hard, firm, sticky and plastic; slightly acid; clear smooth boundary.

Bt1—22 to 32 inches; brown (7.5YR 4/2) silty clay loam, pinkish gray (7.5YR 6/2) dry; moderate medium subangular blocky structure; common fine roots; hard, firm, sticky and plastic; common fine distinct reddish brown (5YR 4/3) iron accumulations; few fine dark manganese concretions; common distinct clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt2—32 to 52 inches; reddish brown (5YR 4/3) silty clay, light reddish brown (5YR 6/3) dry; moderate medium subangular blocky structure; common fine roots; hard, firm, sticky and plastic; common distinct brown (7.5YR 4/2) clay films on faces of peds; few fine and medium manganese concretions; slightly acid; clear smooth boundary.

2Bt3—52 to 71 inches; yellowish red (5YR 4/6) silty clay, reddish yellow (5YR 6/6) dry; moderate medium subangular blocky structure; few fine and medium roots; hard, firm, sticky and plastic; common distinct clay films on faces of peds; slightly acid; abrupt smooth boundary.

R—71 inches; limestone bedrock.

Range in Characteristics

Depth to limestone: 60 to 80 inches
Thickness of the loess mantle: 20 to 30 inches
Thickness of the mollic epipedon: 12 to 30 inches
Depth to redoximorphic concentrations: 17 to 37 inches

Content of clay in the particle-size control section (weighted average): 35 to 45 percent

A horizon:
Hue—10YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—2 or 3
Texture—silty clay loam or silt loam
Reaction—moderately acid or slightly acid

BA horizon:
Hue—10YR or 7.5YR
Value—3 or 4
Chroma—2 or 3
Texture—silty clay loam
Reaction—strongly acid to slightly acid

Bt horizon:
Hue—10YR or 7.5YR
Value—3 to 5 moist, 5 to 7 dry
Chroma—2 to 4
Texture—silty clay loam or silty clay
Content of clay—35 to 45 percent
Reaction—strongly acid or moderately acid

2Bt horizon:
Hue—5YR or 7.5YR
Value—3 to 5 moist, 5 to 7 dry
Chroma—2 to 6
Texture—silty clay loam or silty clay
Content of clay—40 to 65 percent
Reaction—strongly acid to neutral

Chase Series

The Chase series consists of very deep soils that formed in alluvium. These soils are on flood plains. Slopes range from 0 to 2 percent. The mean annual temperature is 56 degrees F, and the mean annual precipitation is 34 inches.

Taxonomic classification: Fine, smectitic, mesic Aquertic Argiudolls

Typical Pedon

Chase silty clay loam, in a cultivated field 1 mile northeast of Reading, in Lyon County, Kansas; 330 feet west and 2,000 feet north of the southeast corner of sec. 34, T. 17 S., R. 13 E. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 6 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; few wormcasts; moderately acid; clear smooth boundary.

A—6 to 14 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; few fine irregular shaped iron-manganese concretions; moderately acid; gradual smooth boundary.

BA—14 to 20 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; few fine distinct dark brown (10YR 3/3) masses of iron accumulation; few

fine rounded iron-manganese concretions; few fine wormholes; few wormcasts; slightly acid; gradual smooth boundary.

Bt1—20 to 34 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; moderate medium and fine subangular blocky structure; very hard, very firm, very sticky and very plastic; common medium distinct dark yellowish brown (10YR 4/4) irregularly shaped masses of iron accumulations; few fine rounded iron-manganese concretions; few fine clay films on faces of peds; few fine wormholes; few wormcasts; slightly acid; gradual smooth boundary.

Bt2—34 to 42 inches; very dark brown (10YR 2/2) silty clay, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; very hard, very firm, very sticky and very plastic; common fine distinct yellowish brown (10YR 5/4) irregularly shaped masses of iron accumulations; few fine rounded iron-manganese concretions; common fine clay films on ped faces; neutral; diffuse smooth boundary.

BC—42 to 54 inches; very dark brown (10YR 2/2) silty clay loam, dark gray (10YR 4/1) dry; very weak blocky structure; hard, firm, sticky and plastic; few fine distinct yellowish brown (10YR 5/4) irregularly shaped masses of iron accumulations; few fine rounded iron-manganese concretions; neutral; diffuse smooth boundary.

C—54 to 80 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark gray (10YR 4/1) dry; massive; hard, firm, sticky and plastic; few fine distinct yellowish brown (10YR 5/4) irregularly shaped iron accumulations; few fine rounded black iron-manganese concretions; slightly alkaline.

Range in Characteristics

Soil moisture regime: Udic
Depth to the argillic horizon: 12 to 30 inches
Depth to redoximorphic concentrations: 6 to 20 inches
Depth to episaturation: 24 to 48 inches from January through April
Thickness of the mollic epipedon: More than 36 inches
Vertic features: Linear extensibility of 6.0 cm or more at a depth of 20 to 42 inches
Content of clay in the particle-size control section (weighted average): 35 to 55 percent
Content of sand in the particle-size control section (weighted average): 1 to 4 percent

A horizon:
Hue—10YR
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 or 2
Texture—silt loam or silty clay loam
Content of clay—12 to 40 percent
Reaction—moderately acid to neutral

BA horizon:
Hue—10YR
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 or 2
Texture—silty clay loam
Content of clay—27 to 40 percent
Reaction—moderately acid to neutral

Bt horizon:
Hue—10YR or 2.5Y
Value—2 to 5 moist, 4 to 6 dry
Chroma—1 or 2
Texture—silty clay loam, silty clay, or clay

Content of clay—35 to 55 percent
Reaction—moderately acid to slightly alkaline

C horizon:
Hue—10YR or 2.5Y
Value—2 to 5 moist, 4 to 6 dry
Chroma—1 or 2
Texture—silty clay loam or silty clay
Content of clay—27 to 55 percent
Reaction—slightly acid to moderately alkaline; fine carbonate concretions in some pedons

Chillicothe Series

The Chillicothe series consists of very deep, moderately well drained, soils that formed in loess or loess and residuum from limestone or shale. These soils are on gently sloping ridgetops and upper side slopes of hills. Slopes range from 2 to 14 percent. The mean annual temperature is 54 degrees F, and the mean annual precipitation is 36 inches.

Taxonomic classification: Fine, smectitic, mesic Oxyaquic Vertic Argiudolls

Typical Pedon

Chillicothe silty clay loam, on a 6 percent slope, in a pasture, at an elevation of 890 feet in Livingston County, Missouri; 2 miles north and 1 mile west of Mooresville; about 1,725 feet east and 400 feet south of the northwest corner of sec. 8, T. 57 N., R. 25 W.; USGS Sampsel topographic quadrangle; lat. 39 degrees 46 minutes 14 seconds N. and long 93 degrees 44 minutes 12 seconds W., NAD 83. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 3 inches; dark brown (10YR 3/3) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; many very fine roots; moderately acid; abrupt smooth boundary.

A—3 to 10 inches; dark brown (10YR 3/3) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; many very fine roots; slightly acid; clear smooth boundary.

Bt1—10 to 19 inches; dark yellowish brown (10YR 4/4) silty clay; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; common very fine roots; many distinct clay films on faces of peds; few soft dark accumulations (oxides); moderately acid; clear smooth boundary.

Bt2—19 to 29 inches; brown (10YR 4/3) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; many distinct clay films on faces of peds; few fine faint light brownish gray (10YR 6/2) iron depletions throughout; few fine dark concretions (oxides); strongly acid; clear smooth boundary.

Bt3—29 to 50 inches; brown (10YR 5/3) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; common distinct clay films on faces of peds; common medium faint light gray (10YR 7/2) iron depletions throughout; common fine soft dark accumulations (oxides); strongly acid; clear smooth boundary.

2BC—50 to 70 inches; reddish brown (5YR 4/4) silty clay; weak medium prismatic structure; firm; common clay flows in voids and pores; moderately acid; abrupt wavy boundary.

3R—70 inches; limestone.

Range in Characteristics

Depth to the base of the argillic horizon: 48 to 80 inches
Depth to a lithic contact: More than 60 inches
Thickness of the mollic epipedon: 10 to 20 inches
Content of sand in the particle-size control section (weighted average): Less than 5 percent
Content of clay in the particle-size control section (weighted average): 35 to 42 percent

A horizon:
Hue—10YR or 7.5YR
Value—2 or 3
Chroma—2 or 3
Texture—silt loam or silty clay loam
Content of clay—20 to 35 percent
Content of sand—1 to 4 percent
Reaction—moderately acid or slightly acid

Bt horizon:
Hue—10YR or 7.5YR
Value—3 to 5
Chroma—2 to 4
Texture—silty clay loam or silty clay
Content of clay—35 to 42 percent
Content of sand—1 to 5 percent
Reaction—strongly acid to slightly acid

2Bt horizon (if it occurs) or 2BC horizon:
Hue—7.5YR or 5YR
Value—4 or 5
Chroma—4 to 8
Texture—silty clay or silty clay loam
Content of clay—35 to 50 percent
Content of sand—1 to 5 percent
Kind of rock fragments—pebbles in some pedons
Reaction—strongly acid to slightly acid

Clareson Series

The Clareson series consists of moderately deep over limestone, well drained soils that formed in residuum derived from limestone. These soils are on uplands.

Taxonomic classification: Clayey-skeletal, mixed, superactive, thermic Typic Argiudolls

Typical Pedon

Clareson silty clay loam, on a convex slope of 2 percent under native grass in Crawford County, Kansas; 4 miles west and 1.75 miles south of Arcadia; 1,100 feet north and 150 feet east of the southwest corner of sec. 8, T. 28 S., R. 25 E. (Colors are for moist soil unless otherwise indicated.)

A—0 to 8 inches; very dark brown (10YR 2/2) silty clay loam; dark grayish brown (10YR 4/2) dry; moderate medium granular structure; hard, friable; many fine roots; slightly acid; gradual smooth boundary.

BA—8 to 14 inches; very dark brown (10YR 2/2) silty clay loam, brown (7.5YR 4/2) dry; moderate medium granular structure; hard, firm; common fine roots; few small fragments of limestone; moderately acid; gradual smooth boundary.

Bt—14 to 25 inches; dark reddish brown (5YR 3/3) very flaggy silty clay, reddish brown (5YR 4/3) dry; moderate medium subangular blocky structure; very hard, very firm; few fine roots; flaggy and smaller limestone fragments comprise 45 percent of the volume; few small black concretions; moderately acid; gradual wavy boundary.

BC—25 to 30 inches; dark reddish brown (5YR 3/3) very flaggy silty clay, reddish brown (5YR 4/3) dry; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; very hard, very firm; flaggy limestone fragments comprise 55 percent of the volume; common small black concretions; neutral; abrupt wavy boundary.

R—30 inches; hard limestone bedrock.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the mollic epipedon: 8 to 20 inches
Content of clay in the particle-size control section (weighted average): 38 to 70 percent
Content of sand in the particle-size control section (weighted average): 1 to 10 percent
Content of rock fragments in the particle-size control section (weighted average): 35 to 85 percent

A horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 3 to 5 dry
Chroma—2 or 3
Texture—silt loam, silty clay loam, stony silty clay loam, stony silt loam, flaggy silt loam, flaggy silty clay loam, or very flaggy silty clay loam
Content of clay—20 to 35 percent
Content of rock fragments—0 to 20 percent
Reaction—moderately acid to neutral

Bt horizon:
Hue—7.5YR, 5YR, or 2.5YR
Value—2 to 4 moist, 4 or 5 dry
Chroma—2 to 6
Texture—silty clay, clay, or silty clay loam
Content of clay—38 to 70 percent
Content of rock fragments—35 to 85 percent limestone channers or flagstones
Reaction—moderately acid to neutral

BC horizon (if it occurs):
Hue—7.5YR to 2.5YR
Value—2 to 4 moist, 4 or 5 dry
Chroma—2 to 6
Texture—silty clay or clay
Content of clay—40 to 70 percent
Content of rock fragments—35 to 85 percent limestone channers or flagstones
Reaction—moderately acid to neutral

Dennis Series

The Dennis series consists of very deep, somewhat poorly drained soils that formed in material weathered from shale of Pennsylvanian age. These soils are on nearly level to sloping uplands of the Cherokee Prairies (MLRA 112). Slopes range from 0 to 8 percent. The mean annual temperature is 61 degrees F, and the mean annual precipitation is 39 inches.

Taxonomic classification: Fine, mixed, active, thermic Aquic Argiudolls

Typical Pedon

Dennis silt loam, in a formerly cultivated field, in an area of rangeland in Rogers County, Oklahoma; about 0.5 mile north of Claremore; 650 feet north and 490 feet east of the center of sec. 4, T. 21 N., R. 16 E. (Colors are for moist soil unless otherwise indicated.)

A—0 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium and fine granular structure; slightly hard, friable; common wormcasts; moderately acid; gradual smooth boundary.

AB—11 to 13 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; slightly hard, friable; common very dark grayish brown wormcasts; strongly acid; clear smooth boundary.

BA—13 to 17 inches; brown (10YR 4/3) silty clay loam, brown (10YR 5/3) dry; common medium and fine faint dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) redoximorphic depletion masses; moderate medium subangular blocky structure; hard and friable in the upper part and firm in the lower part; few very dark grayish brown wormcasts; few fine dark concretions; strongly acid; gradual smooth boundary.

Bt1—17 to 22 inches; yellowish brown (10YR 5/4) clay, light yellowish brown (10YR 6/4) dry; many medium faint yellowish brown (10YR 5/6) redoximorphic concentration masses and common medium faint grayish brown (10YR 5/2) redoximorphic depletion masses; few fine prominent redoximorphic concentration masses of yellowish red; moderate medium blocky structure; very hard, firm; thin nearly continuous clay films on faces of peds; few fine dark concretions; strongly acid; gradual smooth boundary.

Bt2—22 to 30 inches; yellowish brown (10YR 5/4) clay, brownish yellow (10YR 6/6) dry; many medium distinct light brownish gray (10YR 6/2) and gray (10YR 6/1) redoximorphic depletion masses and common fine prominent yellowish red redoximorphic concentration masses; moderate medium blocky structure; very hard, very firm; thin nearly continuous clay films on faces of peds; few fine dark concretions; strongly acid; gradual smooth boundary.

Bt3—30 to 36 inches; yellowish brown (10YR 5/6) clay, brownish yellow (10YR 6/6) dry; many medium and coarse distinct gray (10YR 6/1) redoximorphic depletion masses; weak coarse blocky structure; very hard, very firm; patchy clay films on faces of peds; few fine dark concretions; strongly acid; gradual smooth boundary.

Bt4—36 to 50 inches; mixed yellowish brown (10YR 5/6) and gray (10YR 6/1) clay, brownish yellow (10YR 6/6) and light gray (10YR 7/1) dry redoximorphic depletion and concentration masses; weak coarse blocky structure; very hard, very firm; patchy clay films on faces of peds; few fine dark concretions; many soft black films and bodies; moderately acid; gradual smooth boundary.

Bt5—50 to 68 inches; mixed yellowish brown (10YR 5/8) brownish yellow (10YR 6/6) dry and gray (10YR 6/1); redoximorphic depletion and concentration masses; silty clay loam; weak coarse blocky structure; very hard, firm; patchy clay films on faces of peds; few fine dark concretions; few soft black films and bodies; slightly acid; gradual smooth boundary.

C—68 to 78 inches; yellowish brown (10YR 5/8) silty clay loam, brownish yellow (10YR 6/8) dry; common distinct horizontal streaks of gray (10YR 6/1) redoximorphic depletion masses; weak horizontal lamination and thin seams of siltstone; slightly acid.

Range in Characteristics

Thickness of the solum: More than 60 inches
Thickness of the mollic epipedon: 10 to 15 inches
Content of clay in the particle-size control section (weighted average): 37 to 60 percent
Content of sand in the particle-size control section (weighted average): 5 to 25 percent
Other features: The combined thickness of the A horizon and E horizon is 15 inches or less.

A or Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—2 or 3
Texture—loam, silt loam, or silty clay loam
Reaction—moderately acid or strongly acid

E horizon (if it occurs):
Hue—10YR
Value—4
Chroma—3
Texture—loam or silt loam
Reaction—moderately acid or strongly acid

BE horizon (if it occurs):
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—3 or 4
Texture—silty clay loam or clay loam
Reaction—moderately acid to very strongly acid

Bt horizon (upper part):
Hue—7.5YR to 2.5Y
Value—4 or 5
Chroma—3 to 6
Redoximorphic features—common shades of gray, brown, yellow, or red
Texture—silty clay loam, silty clay, or clay
Reaction—slightly acid to strongly acid

Bt horizon (lower part):
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—6 to 8
Redoximorphic features—common shades of brown, red, gray, or yellow
Texture—silty clay loam, clay loam, silty clay, or clay
Reaction—slightly alkaline to moderately acid

BC and C horizons:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—4 to 8
Redoximorphic features—common shades of brown, red, gray, or yellow

Texture—silty clay loam, clay loam, silty clay, or clay
Reaction—moderately alkaline to moderately acid
Special features—weak laminations or bedding planes in some pedons

Eram Series

The Eram series consists of moderately deep, moderately well drained soils that formed from shales interbedded with thin layers of sandstone of Pennsylvanian age. These very gently sloping to moderately steep soils are on ridges and side slopes of uplands in the Cherokee Prairies (MLRA 112). Slopes range from 1 to 20 percent. The mean annual precipitation is 40 inches, and the mean annual air temperature is 60 degrees F.

Taxonomic classification: Fine, mixed, active, thermic Aquic Argiudolls

Typical Pedon

Eram clay loam, in an area of rangeland in Okmulgee County, Oklahoma; about 5 miles northeast of Beggs; 550 feet north and 300 feet east of the southwest corner of sec. 3, T. 15 N., R. 12 E. (Colors are for moist soil unless otherwise indicated.)

A—0 to 10 inches; very dark grayish brown (10YR 3/2) clay loam; dark grayish brown (10YR 4/2) dry; moderate medium granular structure; hard, firm; slightly acid; gradual smooth boundary.

Bt—10 to 18 inches; very dark grayish brown (10YR 3/2) clay; few fine faint light olive brown redoximorphic concentration masses; moderate medium blocky structure; extremely hard, very firm; nearly continuous clay films on faces of peds; slightly acid; gradual smooth boundary.

BC—18 to 30 inches; brown (10YR 4/3) clay; few fine faint gray redoximorphic depletion masses; weak coarse blocky structure; extremely hard, very firm; slightly acid; gradual smooth boundary.

Cr—30 to 40 inches; gray and olive shale; slightly acid in the upper part, becoming alkaline with depth.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Content of clay in the particle-size control section (weighted average): 35 to 55 percent
Content of sand in the particle-size control section (weighted average): 4 to 10 percent

A horizon:
Hue—7.5YR to 5Y
Value—2 or 3
Chroma—2 or 3
Texture—silt loam, clay loam, silty clay loam, or silty clay
Sandstone fragments less than 3 inches in diameter—0 to 15 percent, by volume
Reaction—moderately acid or slightly acid

Bt horizon:
Hue—5YR to 2.5Y
Value—3 to 5
Chroma—2 to 4
Texture—clay loam, silty clay loam, silty clay, or clay
Content of clay—35 to 55 percent
Reaction—strongly acid to moderately alkaline

Special feature—pedons with value of 4 or 5 and chroma of 3 or 4 have redoximorphic depletions with value of 4 or more and chroma of 2 or less

BC horizon:
Hue—5YR to 2.5Y
Value—4 to 7
Chroma—2 to 6
Redoximorphic features—shades of gray, brown, and red
Texture—clay loam, silty clay loam, silty clay, or clay
Reaction—strongly acid to moderately alkaline

Cr horizon:
Kind of bedrock—gray or olive shales or compacted clay beds interbedded with thin layers of sandstone
Excavation difficulty—moderate to high
Reaction—slightly acid to moderately alkaline

Eudora Series

The Eudora series consists of very deep, well drained soils that formed in silty or loamy alluvium. These soils are on flood-plain steps. Slopes range from 0 to 2 percent. The mean annual air temperature is 54 degrees F, and the mean annual precipitation is 36 inches.

Taxonomic classification: Coarse-silty, mixed, superactive, mesic Fluventic Hapludolls

Typical Pedon

Eudora silt loam, in a cultivated field in Johnson County, Kansas; 2 miles east and 0.5 mile south of Bonner Springs; 200 feet north of the center of sec. 34, T. 11 S., R. 23 E.; lat. 39 degrees 03 minutes 08 seconds N. and long. 94 degrees 50 minutes 58 seconds W. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; neutral; abrupt smooth boundary.
A—7 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; neutral; clear smooth boundary.
C1—14 to 40 inches; grayish brown (10YR 5/2) silt loam, light brownish gray (10YR 6/2) dry; massive; soft, very friable, slightly sticky and slightly plastic; neutral; gradual smooth boundary.
C2—40 to 48 inches; grayish brown (10YR 5/2) very fine sandy loam, light brownish gray (10YR 6/2) dry; massive; soft, very friable, nonsticky and nonplastic; moderately alkaline; gradual smooth boundary.
C3—48 to 80 inches; grayish brown (10YR 5/2) silt loam, light brownish gray (10YR 6/2) dry; massive; soft, very friable, nonsticky and nonplastic; slight effervescence; moderately alkaline.

Range in Characteristics

Redoximorphic concentrations: Faint redoximorphic concentrations are at depths below 30 inches in some pedons.
Particle-size control section (weighted average): 10 to 40 inches
Content of clay in the particle-size control section (weighted average): 5 to 18 percent

Content of sand in the particle-size control section (weighted average): 10 to 50 percent

A horizon:
Hue—10YR
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 or 2
Texture—silt loam, loam, very fine sandy loam, or fine sandy loam
Content of clay—10 to 18 percent
Reaction—strongly acid to slightly alkaline

AC horizon:
Hue—10YR
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 to 3
Texture—silt loam, loam, very fine sandy loam, or fine sandy loam
Content of clay—5 to 18 percent
Reaction—strongly acid to slightly alkaline

C horizon:
Hue—10YR
Value—4 to 6 moist, 5 to 7 dry
Chroma—1 to 3
Texture—silt loam, loam, or very fine sandy loam
Content of clay—5 to 18 percent
Calcium carbonate equivalent—0 to 5 percent
Reaction—strongly acid to moderately alkaline

Grundy Series

The Grundy series consists of very deep, somewhat poorly drained soils that formed in loess. These soils are on divides and interfluves. Slopes range from 0 to 9 percent. The mean annual air temperature is about 54 degrees F, and the mean annual precipitation is about 34 inches.

Taxonomic classification: Fine, smectitic, mesic Aquertic Argiudolls

Typical Pedon

Grundy silt loam, on a 3 percent slope, in a cultivated field, in Major Land Resource Area 109—Iowa and Missouri Heavy Till Plain; Harrison County, Missouri, subset; about 2.5 miles north and 2 miles west of Ridgeway; about 1,175 feet east and 125 feet south of the center of sec. 19, T. 65 N., R. 27 W.; USGS Eagleville topographic quadrangle; lat. 40 degrees 25 minutes 04 seconds N. and long. 93 degrees 58 minutes 44 seconds W., NAD 83. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; common fine and medium roots; neutral, clear smooth boundary.

A—9 to 11 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak very fine subangular blocky structure; friable; common fine and medium roots; slightly acid; clear smooth boundary.

BA—11 to 14 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate very fine subangular blocky structure; firm; common fine roots; slightly acid; clear smooth boundary.

Btg1—14 to 18 inches; dark grayish brown (10YR 4/2) silty clay; moderate very fine

and fine subangular blocky structure; firm; common fine roots; common distinct clay films on faces of peds; common fine distinct yellowish brown (10YR 5/4) iron masses with diffuse boundaries; moderately acid; clear smooth boundary.

Btg2—18 to 24 inches; dark grayish brown (10YR 4/2) silty clay; moderate fine subangular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; common fine prominent yellowish brown (10YR 5/6) iron masses with diffuse boundaries; slightly acid; gradual smooth boundary.

Btg3—24 to 38 inches; grayish brown (2.5Y 5/2) silty clay; weak medium prismatic structure parting to weak medium subangular blocky; firm; common distinct clay films on faces of peds; common fine distinct yellowish brown (10YR 5/4) iron masses with diffuse boundaries; few fine black streaks in cracks and few fine dark concretions (oxides); neutral; gradual smooth boundary.

Btg4—38 to 53 inches; grayish brown (2.5Y 5/2) silty clay loam; weak fine prismatic structure parting to weak fine subangular blocky; firm; few faint clay films on faces of peds; few medium prominent strong brown (7.5YR 5/8) iron masses with diffuse boundaries; few fine dark streaks in cracks (oxides); neutral; gradual smooth boundary.

Cg—53 to 72 inches; olive gray (5Y 5/2) silty clay loam; massive; firm; common fine prominent yellowish brown (10YR 5/4) iron masses with diffuse boundaries; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 11 to 20 inches
Depth to carbonates: More than 72 inches
Content of clay in the particle-size control section (weighted average): 42 to 48 percent
Content of sand in the particle-size control section (weighted average): 0 to 5 percent

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam
Content of clay—20 to 35 percent
Content of sand—0 to 5 percent
Reaction—moderately acid to neutral (pH range 5.6 to 7.3)

Btg horizon:
Hue—10YR to 2.5Y
Value—3 to 6
Chroma—1 to 3
Texture—silty clay loam or silty clay
Content of clay—42 to 48 percent; up to 50 percent in layers less than 7 inches thick
Content of sand—0 to 5 percent
Reaction—strongly acid to neutral (pH range 5.1 to 7.3)

Cg horizon:
Hue—10YR to 5Y
Value—4 to 6
Chroma—1 or 2
Texture—silt clay loam or silt loam
Content of clay—24 to 35 percent
Content of sand—0 to 5 percent
Reaction—slightly acid or neutral (pH range 6.1 to 7.3)

Gymer Series

The Gymer series consists of very deep, well drained soils that formed in silty alluvial sediments of Loveland age. These soils are on stream terraces. Slopes range from 1 to 8 percent. The mean annual precipitation is about 34 inches, and the mean annual temperature is about 54 degrees F.

Taxonomic classification: Fine, smectitic, mesic Typic Argiudolls

Typical Pedon

Gymer silt loam, 3 to 8 percent slopes, in an area of pasture in Douglas County, Kansas; about 5 miles north and 0.5 mile east of Lawrence; 1,700 feet south and 1,400 feet west of the northeast corner of sec. 6, T. 12 S., R. 20 E.; USGS Midland topographic quadrangle; lat. 39 degrees 02 minutes 25 seconds N. and long. 95 degrees 13 minutes 43 seconds W. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 10 inches; dark brown (7.5YR 3/2) silt loam, brown (7.5YR 4/2) moist; moderate medium granular blocky structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common medium tubular pores; slightly acid; abrupt smooth boundary.

BA—10 to 14 inches; dark brown (7.5YR 3/3) silty clay loam, dark brown (7.5YR 3/4) moist; weak fine subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and fine roots throughout; common medium tubular pores; moderately acid; clear smooth boundary.

Bt1—14 to 22 inches; reddish brown (5YR 4/4) silty clay loam, reddish brown (5YR 5/4) moist; moderate fine subangular blocky structure; slightly hard, firm, sticky and plastic; common very fine and fine roots throughout; common very fine to medium tubular pores; common distinct continuous clay films throughout; moderately acid; clear smooth boundary.

Bt2—22 to 34 inches; yellowish red (5YR 4/6) silty clay loam, reddish brown (5YR 4/3) dry; common fine distinct yellowish red (5YR 4/6) moist; strong medium prismatic structure parting to moderate coarse subangular blocky; hard, firm, sticky and plastic; many very fine roots throughout; many very fine and fine tubular pores; common faint continuous clay films throughout; few fine rounded black (N 2/0) soft masses of iron-manganese throughout; moderately acid; clear smooth boundary.

Bt3—34 to 45 inches; brown (7.5YR 4/4) silty clay loam, brown (7.5YR 5/4) moist; moderate medium subangular blocky structure; hard, very firm, sticky and plastic; common very fine and fine roots throughout; many very fine and fine tubular pores; common distinct continuous dark clay films throughout; slightly hard iron-manganese concretions throughout; moderately acid; clear smooth boundary.

BCt—45 to 54 inches; yellowish red (5YR 4/6) silty clay loam, yellowish red (5YR 5/6) dry; common fine distinct dark reddish gray (2.5YR 3/1) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; common very fine roots throughout; common very fine tubular pores; common distinct continuous dark reddish brown (2.5YR 3/4) clay films throughout and few distinct discontinuous black (N 2/0) manganese or iron-manganese stains throughout; common fine rounded black (N 2/0) soft masses of iron-manganese concretions throughout; moderately acid; clear smooth boundary.

BC—54 to 64 inches; yellowish red (5YR 5/6) silt loam, reddish yellow (5YR 6/6) dry; common fine distinct very dark gray (2.5Y 3/1) moist irregular redoximorphic depletions throughout; moderate fine prismatic structure parting to moderate fine subangular blocky; hard, firm, very sticky and very plastic; common very fine roots throughout; common very fine tubular pores; common distinct discontinuous

clay films throughout and very few distinct discontinuous black (N 2/0) manganese or iron-manganese stains throughout; few fine irregular black (N 2/0) slightly hard soft masses of iron-manganese concretions throughout; moderately acid; gradual wavy boundary.

C—64 to 80 inches; olive (5Y 4/3) silty clay loam, pale olive (5Y 6/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; throughout; common very fine and fine tubular pores; few fine irregular black (N 2/0) iron-manganese concretions throughout; moderately acid.

Range in Characteristics

Soil moisture regime: Udic; the soil moisture control section is 4 to 12 inches below the surface.
Mean annual soil temperature: 52 to 55 degrees F
Thickness of the mollic epipedon: 8 to 20 inches
Depth to the argillic horizon: 10 to 15 inches
Particle-size control section (weighted average): 25 to 35 percent
Content of clay in the particle-size control section (weighted average): 29 to 31 percent
Content of sand in the particle-size control section (weighted average): 0 to 10 percent

A horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—1 to 3
Texture—silt loam or silty clay loam
Content of clay—20 to 35 percent
Base saturation—60 to 85 percent
Reaction—moderately acid to slightly alkaline

BA horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—2 or 3
Texture—silty clay loam or silty loam
Content of clay—20 to 30 percent
Base saturation—65 to 90 percent
Reaction—strongly acid to slightly alkaline

Bt horizon:
Hue—7.5YR or 5YR
Value—3 to 5 moist, 4 to 6 dry
Chroma—2 to 6
Texture—silty clay loam or silt loam
Content of clay—25 to 35 percent
Base saturation—70 to 90 percent
Reaction—strongly acid to slightly alkaline

BC horizon:
Hue—7.5YR or 5YR
Value—3 to 5 moist, 4 to 6 dry
Chroma—2 to 6
Texture—loam, silty clay loam, or silt loam
Content of clay—20 to 30 percent
Base saturation—70 to 95 percent
Reaction—moderately acid to slightly alkaline

C horizon:
Hue—7.5YR or 5YR
Value—3 to 5 moist, 4 to 6 dry
Chroma—2 to 6
Texture—loam, silty clay loam, or silt loam
Content of clay—20 to 30 percent
Base saturation—70 to 85 percent
Reaction—moderately acid to slightly alkaline

Hepler Series

The Hepler series consists of very deep, somewhat poorly drained soils that formed in silty alluvial sediments. These nearly level to very gently sloping soils are on flood plains in the Cherokee Prairies (MLRA 112) and Ozark Highlands (MLRA 116A). Slopes range from 0 to 3 percent. The mean annual precipitation is 43 inches, and the mean annual temperature is 59 degrees F.

Taxonomic classification: Fine-silty, mixed, superactive, thermic Mollic Endoaqualfs

Typical Pedon

Hepler silt loam, in a cultivated field in Crawford County, Kansas; 2.5 miles south and 0.5 mile west of Walnut; 400 feet east and 2,440 feet north of the southwest corner of sec. 35, T. 28 S., R. 21 E. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; weak fine and medium granular structure; slightly hard, friable; moderately acid; clear smooth boundary.

E1—8 to 16 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine and medium granular structure; hard, friable; strongly acid; gradual wavy boundary.

E2—16 to 27 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; weak medium subangular blocky structure; hard, friable; few fine distinct yellowish brown (10YR 5/4) irregularly shaped masses of iron accumulation with diffuse boundaries throughout; few fine pores; strongly acid; gradual wavy boundary.

Btg1—27 to 32 inches; dark grayish brown (10YR 4/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate medium and coarse subangular blocky structure; very hard, firm; few fine distinct yellowish brown (10YR 5/6) irregularly shaped masses of iron accumulation with diffuse boundaries throughout; common fine pores; ped surfaces coated with grayish brown (10YR 5/2) silt loam; very strongly acid; gradual wavy boundary.

Btg2—32 to 38 inches; dark gray (10YR 4/1) silty clay loam, gray (10YR 5/1) dry; weak medium blocky structure; very hard, very firm; common medium distinct yellowish brown (10YR 5/6) irregularly shaped masses of iron accumulation with diffuse boundaries throughout; thin clay films on some faces of peds; few fine black (N 2/0) strongly cemented manganese concretions throughout; very strongly acid; gradual wavy boundary.

BCg—38 to 62 inches; dark gray (10YR 4/1) silty clay loam, gray (10YR 5/1) dry; weak coarse subangular blocky structure; very hard, very firm; many medium and coarse distinct yellowish brown (10YR 5/6) irregularly shaped masses of iron accumulation with diffuse boundaries throughout; very strongly acid.

Range in Characteristics

Depth to the argillic horizon: 16 to 30 inches
Depth to redoximorphic concentrations: 4 to 12 inches

Depth to endosaturation: 12 to more than 72 inches from January to May
Content of clay in the particle-size control section (weighted average): 18 to 35 percent
Content of sand in the particle-size control section (weighted average): 4 to 15 percent

Ap or A horizon:
Hue—10YR
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 or 2
Texture—silt loam
Content of clay—15 to 19 percent
Base saturation—59 to 79 percent
Reaction—slightly acid to strongly acid

E horizon:
Hue—10YR or 2.5Y
Value—4 or 5 moist, 5 to 7 dry
Chroma—2 or 3
Redoximorphic features—none to common masses of iron accumulations; none to common masses of iron-manganese; none to few iron-manganese concretions
Texture—silt loam
Content of clay—13 to 17 percent
Base saturation—40 to 62 percent
Reaction—moderately acid to very strongly acid

B horizon:
Hue—10YR or 2.5Y
Value—3 to 5 moist, 4 to 6 dry
Chroma—1 or 2
Redoximorphic features—few to many masses of iron accumulations; none to few iron-manganese concretions; none to common masses of iron-manganese
Texture—silty clay loam or silt loam; ranges to silty clay (lower part)
Content of clay—14 to 34 percent
Base saturation—40 to 84 percent
Reaction—slightly acid to very strongly acid

2B horizon (if it occurs):
Hue—10YR or 2.5Y
Value—3 to 5 moist, 4 to 6 dry
Chroma—1 or 2
Redoximorphic features—few to many masses of iron accumulations; none to few iron-manganese concretions; none to common masses of iron-manganese
Texture—silty clay loam or silt loam; ranges to silty clay (lower part)
Content of clay—31 to 45 percent
Base saturation—85 to 90 percent
Reaction—slightly acid to very strongly acid

Kennebec Series

The Kennebec series consists of very deep, moderately well drained soils that formed in dark colored silty alluvium with low content of fine sand or coarse sand. These soils are on flood plains and upland drainageways. Slopes range from 0 to 5 percent. The mean annual air temperature is about 49 degrees F, and the mean annual precipitation is about 30 inches.

Taxonomic classification: Fine-silty, mixed, superactive, mesic Cumulic Hapludolls

Typical Pedon

Kennebec silt loam, on a slope of about 1 percent, in a cultivated area about 7 miles southwest of Dow City, in Crawford County, Iowa; about 2,110 feet north and 62 feet east of the southwest corner of sec. 27, T. 82 N., R. 41 W.; USGS Dunlap NE. topographic quadrangle; lat. 41 degrees 52 minutes 59.5 seconds N. and long. 95 degrees 36 minutes 54.3 seconds W., NAD 83. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 8 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; common fine and very fine roots; few fine and very fine pores; slightly acid; clear smooth boundary.

A1—8 to 18 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; moderate fine subangular blocky structure; friable; common fine and very fine roots; common fine pores; slightly acid; diffuse smooth boundary.

A2—18 to 32 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry, very dark brown (10YR 2/2) crushed; moderate fine and medium subangular blocky structure; friable; common fine and very fine roots; common fine and medium pores; slightly acid; diffuse smooth boundary.

A3—32 to 41 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry, very dark brown (10YR 2/2) crushed; weak fine and medium subangular blocky structure; friable; few very fine roots; few fine and medium pores; many large wormholes; slightly acid; diffuse smooth boundary.

AC—41 to 54 inches; very dark gray (10YR 3/1) silt loam, very dark grayish brown (10YR 3/2) crushed; weak medium subangular blocky structure; friable; few very fine roots; few very fine pores; slightly acid; diffuse smooth boundary.

C1—54 to 63 inches; very dark grayish brown (10YR 3/2) silt loam; massive; friable; few fine pores; few fine rounded very dark brown (7.5YR 2.5/2) iron and manganese concretions; common medium faint dark brown (10YR 3/3) and common fine distinct dark yellowish brown (10YR 4/4) redoximorphic concentrations; few fine faint grayish brown (10YR 5/2) redoximorphic depletions; slightly acid; diffuse smooth boundary.

C2—63 to 72 inches; very dark grayish brown (10YR 3/2) silt loam; massive; friable; few fine pores; common fine prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; slightly acid; diffuse smooth boundary.

C3—72 to 80 inches; very dark grayish brown (10YR 3/2) silt loam; massive; friable; few fine pores; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; slightly acid.

Range in Characteristics

Depth to carbonates: More than 80 inches
Thickness of the mollic epipedon: More than 40 inches
Content of clay in the particle-size control section (weighted average): 18 to 30 percent
Content of sand in the particle-size control section (weighted average): Less than 10 percent fine and coarser sand

Ap or A horizon:
Hue—10YR; 10YR (overwash)
Value—2 or 3; 3 or 4 (overwash)
Chroma—1 or 2; 1 or 2 (overwash)
Texture—silt loam or silty clay loam; silt loam (overwash)
Content of clay—18 to 30 percent; 18 to 27 percent (overwash)

Content of sand—less than 10 percent; less than 10 percent (overwash)
Reaction—moderately acid to neutral; moderately acid to neutral (overwash)

AB horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam
Content of clay—18 to 32 percent
Content of sand—less than 10 percent
Reaction—slightly acid or neutral

AC horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam
Content of clay—18 to 32 percent
Content of sand—less than 10 percent
Reaction—slightly acid or neutral

Bw horizon (if it occurs):
Hue—10YR or 2.5Y
Value—2 to 4
Chroma—2 or 3
Texture—silt loam or silty clay loam
Content of clay—24 to 33 percent
Content of sand—less than 15 percent
Reaction—slightly acid or neutral
Special features—iron and manganese concretions, redoximorphic concentrations, and redoximorphic depletions in some pedons

C horizon:
Hue—10YR or 2.5Y
Value—2 to 4
Chroma—1 or 2
Texture—silt loam or silty clay loam
Content of clay—24 to 30 percent
Content of sand—less than 15 percent
Reaction—slightly acid or neutral
Special features—iron and manganese concretions, redoximorphic concentrations, and redoximorphic depletions in some pedons

Kenoma Series

The Kenoma series consists of deep, moderately well drained soils that formed in old alluvial sediments. These soils are on uplands or terraces.

Taxonomic classification: Fine, smectitic, thermic Vertic Argiudolls

Typical Pedon

Kenoma silt loam, in a native grass meadow in Anderson County, Kansas; about 0.5 mile east of Lone Elm; 1,750 feet east and 550 feet north of the southwest corner of sec. 32, T. 22 S., R. 20 E. (Colors are for moist soil unless otherwise indicated.)

A—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; upper 4 inches moderate fine platy structure parting to weak fine

granular; lower 3 inches weak fine subangular blocky structure parting to weak fine granular; slightly hard, friable; many fine roots; many wormcasts; few fine chert fragments; slightly acid; abrupt wavy boundary.

Bt1—7 to 11 inches; very dark grayish brown (10YR 3/2) silty clay, grayish brown (10YR 5/2) dry; many vertical streaks of very dark brown (10YR 2/2) silt loam; common fine faint mottles of brown (10YR 5/3) and dark yellowish brown (10YR 4/4); weak fine prismatic structure parting to weak very fine blocky; hard, very firm; common fine roots; few fine pores; light gray (10YR 7/1) silt coatings on peds in upper 1½ inches; few worm casts; thin discontinuous clay films; black concretions (oxides); few fine chert fragments; moderately acid; clear irregular boundary.

Bt2—11 to 17 inches; dark brown (10YR 3/3) silty clay, faces of peds, very dark grayish brown (10YR 3/2), brown (10YR 4/3) dry; few fine vertical streaks of very dark brown (10YR 2/2) silt loam; common fine faint mottles of dark yellowish brown (10YR 4/4); weak very fine subangular blocky structure; very hard, very firm; common fine roots; few fine pores; thin distinct clay films; black concretions (oxides); few fine chert fragments; slightly acid; clear irregular boundary.

Bt3—17 to 26 inches; brown (10YR 4/3) silty clay, brown (10YR 5/3) dry, few fine vertical streaks of very dark brown (10YR 2/2) silt loam; common very fine faint mottles of yellowish brown (10YR 5/4 and 5/6); weak very fine subangular blocky structure; very hard, very firm; few fine roots; few very fine pores; thin distinct clay films; black concretions (oxides); few fine chert fragments; neutral; gradual irregular boundary.

BC—26 to 38 inches; dark yellowish brown (10YR 4/4) silty clay, yellowish brown (10YR 5/6) dry; common very fine faint mottles of yellowish brown (10YR 5/4); weak very fine subangular blocky structure; hard, firm; few fine roots; black concretions (oxides); few fine chert fragments; few small lime concretions; moderately alkaline; diffuse boundary.

C1—38 to 56 inches; brown (7.5YR 4/4) silty clay, light brown (7.5YR 6/4) dry; common fine, faint mottles of yellowish brown (10YR 5/4); massive; hard, firm; common black concretions (oxides); few fine chert fragments; few lime concretions up to 1½ inches in diameter; moderately alkaline; diffuse boundary.

C2—56 to 60 inches; mottled reddish brown (5YR 4/4), light brownish gray (2.5Y 6/2), pale olive (5Y 6/3), and yellowish brown (10YR 5/6) silty clay loam; massive; hard, firm; many black films and stains; few small lime concretions; small fragments of decomposed shale; moderately alkaline.

Range in Characteristics

Thickness of the solum: 30 to 60 inches
Content of fragements: Less than 20 percent water-worn chert in any horizon
Depth to limestone or shale: More than 40 inches
Content of clay in the particle-size control section (weighted average): 35 to 60 percent
Content of sand in the particle-size control section (weighted average): 1 to 10 percent

A horizon:
Hue—10YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—1 to 3
Texture—silt loam or silty clay loam
Content of clay—18 to 29 percent
Reaction—strongly acid to slightly acid

Bt horizon (upper part):
Hue—10YR or 7.5YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—2 or 3
Redoximorphic features—common to many brown, yellowish brown, or reddish brown mottles
Texture—silty clay or clay
Content of clay—35 to 60 percent
Reaction—strongly acid to slightly acid

Bt horizon (lower part):
Hue—10YR to 5YR
Value—3 to 6 moist, 4 to 7 dry
Chroma—2 to 6
Redoximorphic features—common to many brown, yellowish brown, or reddish brown mottles
Texture—silty clay loam, silty clay, or clay
Content of clay—35 to 60 percent
Reaction—moderately acid to moderately akaline

C horizon:
Hue—5YR to 5Y
Value—4 to 6 moist, 5 to 7 dry
Chroma—2 to 6
Redoximorphic features—fine to coarse yellowish brown, yellowish red, reddish brown, reddish yellow, light brownish gray, or pale olive mottles
Texture—silty clay loam or silty clay
Reaction—slightly acid to moderately alkaline
Special feature—fragments of limestone and bedded shale in some pedons

Kimo Series

The Kimo series consists of very deep, somewhat poorly drained soils that formed in clayey over loamy alluvium. These soils are in old channels on flood-plain steps. Slopes are 0 to 1 percent.

Taxonomic classification: Clayey over loamy, smectitic, mesic Fluvaquentic Hapludolls

Typical Pedon

Kimo silty clay loam, in a cultivated area in Shawnee County, Kansas; about 4.5 miles west of Rossville; 2,540 feet west and 100 feet south of the northeast corner of sec. 36, T. 10 S., R. 12 E.; USGS Rossville topographic quadrangle lat. 39 degrees 04 minutes 16 seconds N. and long. 95 degrees 34 minutes 50 seconds W. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; hard, firm, sticky and plastic; moderately alkaline; abrupt smooth boundary.

A1—7 to 15 inches; very dark grayish brown (10YR 3/2) silty clay, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; very hard, very firm, very sticky and very plastic; neutral; gradual smooth boundary.

A2—15 to 23 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish

brown (10YR 5/2) dry; weak medium subangular blocky structure; very hard, very firm, very sticky and very plastic; neutral; gradual smooth boundary.

AC—23 to 27 inches; dark grayish brown (10YR 4/2) and very dark grayish brown (10YR 3/2) silty clay loam, light brownish gray (10YR 6/2) and dark grayish brown (10YR 4/2) dry; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; weak fine subangular blocky structure; hard, firm, sticky and plastic; neutral; abrupt smooth boundary.

2C1—27 to 42 inches; grayish brown (10YR 5/2) silt loam, light brownish gray (10YR 6/2) dry; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; massive; soft, very friable, nonsticky and nonplastic; neutral; diffuse wavy boundary.

2C2—42 to 60 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; thin strata of light gray (10YR 7/2) very fine sand; massive; soft, very friable, nonsticky and nonplastic; moderately alkaline.

Range in Characteristics

Depth to redoximorphic concentrations: 23 to 42 inches
Thickness of the mollic epipedon: 16 to 24 inches
Particle-size control section (weighted average): 10 to 40 inches
Content of clay in the particle-size control section (weighted average): 35 to 60 percent

A horizon:
Hue—10YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—1 or 2
Texture—silty clay loam, silty clay, or fine sandy loam; loamy fine sand and loamy very fine sand (overwash)
Content of clay—35 to 60 percent
Reaction—moderately acid to moderately alkaline

AC horizon:
Hue—10YR
Value—3 or 4 moist, 5 or 6 dry
Chroma—1 or 2
Texture—silty clay loam or silty clay
Content of clay—35 to 60 percent
Reaction—moderately acid to moderately alkaline

C horizon:
Hue—10YR
Value—3 or 4 moist, 5 or 6 dry
Chroma—1 or 2
Texture—silt loam or silty clay loam
Content of clay—18 to 35 percent
Reaction—moderately acid to moderately alkaline

2C horizon:
Hue—10YR
Value—4 to 6 moist, 5 to 7 dry
Chroma—1 or 2
Texture—silt loam, very fine sandy loam, loam; thin strata of fine sand and sand
Content of clay—5 to 18 percent
Reaction—moderately acid to moderately alkaline

Kiro Series

The Kiro series consists of very deep, poorly drained soils in old channels and depressions on flood-plain steps. They formed in clayey alluvium. Slopes are 0 to 1 percent.

Taxonomic classification: Fine, smectitic, mesic Fluvaquentic Endoaquolls

Typical Pedon

Kiro silty clay, in a depression in Shawnee County, Kansas; about 4.5 miles east of Rossville; 2,540 feet west and 100 feet south of the southeast corner of sec. 17, T. 11 S., R. 15 E.; USGS Topeka topographic quadrangle; lat. 39 degrees 12 minutes 05 seconds N. and long. 96 degrees 09 minutes 54 seconds W. (Colors are for moist soil unless otherwise indicated.)

A1—0 to 8 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; weak fine granular structure; hard, firm, sticky and plastic; slightly acid; clear smooth boundary.

A2—8 to 17 inches; very dark gray (10YR 3/1) silty clay, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; very hard, very firm, very sticky and very plastic; neutral; gradual smooth boundary.

A3—17 to 28 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; moderate medium subangular blocky structure; very hard, very firm, very sticky and very plastic; neutral; gradual smooth boundary.

A4—28 to 41 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; moderate medium subangular blocky structure; hard, firm, sticky and plastic; slightly alkaline; thin strata of pale brown (10YR 6/3) silt loam; common smooth boundary.

AC—41 to 53 inches; dark gray (10YR 4/1) silty clay, light brownish gray (10YR 6/2) dry; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; weak coarse subangular blocky structure; hard, firm, sticky and plastic; slightly alkaline; abrupt smooth boundary.

2C—53 to 70 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; thin strata of very fine sand; massive; soft, very friable, nonsticky and nonplastic; moderately alkaline.

Range in Characteristics

Depth to redoximorphic concentrations: 10 to 20 inches
Thickness of the mollic epipedon: 24 to 42 inches
Particle-size control section (weighted average): 10 to 40 inches
Content of clay in the particle-size control section (weighted average): 35 to 60 percent

A horizon:
Hue—10YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—1 or 2
Texture—silty clay, clay, or silty clay loam
Content of clay—35 to 60 percent
Reaction—slightly acid to slightly alkaline

AC horizon:
Hue—10YR
Value—3 or 4 moist, 5 or 6 dry
Chroma—1 or 2

Texture—silty clay loam, silty clay, or clay
Content of clay—45 to 60 percent
Reaction—neutral to moderately alkaline

2C horizon:
Hue—10YR
Value—4 to 6 moist, 5 to 7 dry
Chroma—1 or 2
Texture—silt loam, very fine sandy loam, or loam; thin strata of fine sand and sand
Content of clay—5 to 18 percent
Reaction—neutral to moderately alkaline

Ladoga Series

The Ladoga series consists of very deep, moderately well drained soils that formed in loess. These soils are on convex summits of interfluves, side slopes, and nose slopes on dissected till plains and treads and risers on stream terraces. Slopes range from 0 to 30 percent. The mean annual air temperature is about 51 degrees F, and the mean annual precipitation is about 32 inches.

Taxonomic classification: Fine, smectitic, mesic Mollic Hapludalfs

Typical Pedon

Ladoga silt loam, on a north-facing slope of 7 percent, in a deciduous forest, in Major Land Resource Area (MLRA) 108D—Illinois and Iowa Deep Loess and Drift, Western Part; Guthrie County, Iowa, subset; about 5 miles south and 3 miles west of Guthrie Center; about 1,500 feet south and 1,400 feet east of the northwest corner of sec. 5, T. 78 N., R. 32 W.; USGS Casey quadrangle; lat. 41 degrees 35 minutes 52 seconds N. and long. 94 degrees 33 minutes 48 seconds W., NAD 83. (Colors are for moist soil unless otherwise indicated.)

A—0 to 7 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) kneaded, gray (10YR 5/1) dry; moderate fine granular structure; friable; neutral; clear smooth boundary.

E—7 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium platy structure; friable; few very dark gray (10YR 3/1) organic stains on faces of peds and wormcasts; slightly acid; abrupt smooth boundary.

BE—10 to 14 inches; brown (10YR 4/3) silty clay loam; weak fine subangular blocky structure; friable; common dark grayish brown (10YR 4/2) silt coats on faces of peds; moderately acid; gradual smooth boundary.

Bt1—14 to 19 inches; brown (10YR 4/3) silty clay loam; weak medium subangular blocky structure parting to moderate and strong fine subangular blocky; friable; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common dark grayish brown (10YR 4/2) silt coats on faces of peds; moderately acid; gradual smooth boundary.

Bt2—19 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium and fine subangular and angular blocky structure; firm; many distinct brown (10YR 4/3) clay films on faces of peds; few distinct dark grayish brown (10YR 4/2) silt coats on faces of peds; strongly acid; gradual smooth boundary.

Bt3—25 to 32 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular and angular blocky structure; firm; common distinct brown (10YR 4/3) clay films on faces of peds; few distinct grayish brown (10YR 5/2) silt coats on

vertical faces of peds; few fine concretions; strongly acid; gradual smooth boundary.

Bt4—32 to 45 inches; brown (10YR 5/3) silty clay loam; weak medium prismatic structure parting to weak fine and medium angular blocky; friable; few distinct brown (10YR 4/3) clay films on faces of peds; common fine concretions; common fine and medium olive gray (5Y 5/2) redoximorphic depletions; strongly acid; gradual smooth boundary.

Bt5—45 to 51 inches; brown (10YR 5/3) silty clay loam; weak medium prismatic structure parting to weak medium angular blocky; friable; few distinct brown (10YR 4/3) clay films on faces of peds and on surfaces along pores; common fine and medium olive gray (5Y 5/2) redoximorphic depletions; moderately acid; gradual smooth boundary.

C—51 to 60 inches; brown (10YR 5/3) silt loam; massive; friable; many fine and medium olive gray (5Y 5/2) redoximorphic depletions; slightly acid.

Range in Characteristics

Depth to carbonates: More than 59 inches

Content of clay in the particle-size control section (weighted average): 35 to 42 percent

Content of sand in the particle-size control section (weighted average): Less than 5 percent

Ap or A horizon:

Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam
Content of clay—18 to 35 percent
Content of sand—less than 5 percent
Reaction—moderately acid to neutral

E horizon (if it occurs):

Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam or silty clay loam
Content of clay—15 to 35 percent
Content of sand—less than 5 percent
Reaction—moderately acid or slightly acid

BE horizon (if it occurs):

Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam or silty clay loam
Content of clay—25 to 35 percent
Content of sand—less than 5 percent
Reaction—strongly acid to slightly acid

Bt horizon:

Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silty clay
Content of clay—35 to 42 percent

Content of sand—less than 5 percent
Reaction—strongly acid or moderately acid

BC horizon (if it occurs) and C horizon:
Hue—10YR
Value—5
Chroma—2 to 4
Texture—silty clay loam or silt loam
Content of clay—24 to 32 percent
Content of sand—less than 5 percent
Reaction—moderately acid or slightly acid

Lebo Series

The Lebo series consists of moderately deep to shale, well drained soils that formed in residuum from shale interbedded with sandstone. These soils are on uplands. Slope ranges from 8 to 40 percent. The mean annual temperature is 58 degrees F, and the mean annual precipitation is 36 inches.

Taxonomic classification: Loamy-skeletal, mixed, thermic Typic Hapludolls

Typical Pedon

Lebo channery silty clay loam, on a west-facing 25 percent slope under mixed hardwoods in Linn County, Kansas; 2.5 miles northeast of La Cygne, Kansas; 1,450 feet south and 50 feet east of the northwest corner of sec. 36, T. 19 S., R. 24 E. (Colors are for moist soil unless otherwise indicated.)

A—0 to 11 inches; very dark grayish brown (10YR 3/2) channery silty clay loam, dark grayish brown (10YR 4/2) dry; strong medium granular structure; hard, friable; many fine roots; limestone fragments, 1 to 3 inches in diameter, comprise about 20 percent by volume; neutral; gradual wavy boundary.

BW—11 to 18 inches; dark grayish brown (10YR 4/2) channery silty clay loam with slightly more clay than in the BC or C horizons, grayish brown (10YR 5/2) dry; strong fine subangular blocky structure; hard, friable; common fine roots; many pores; coarse fragments, by volume, consist of 10 percent shale and 20 percent sandstone and range from $^{1}/_{4}$ inch to 2 inches in diameter and $^{1}/_{16}$ to $^{1}/_{4}$ inch thick; neutral; gradual wavy boundary.

BC—18 to 28 inches; grayish brown (10YR 5/2) shaly silty clay loam, light brownish gray (10YR 6/2) dry; moderate fine subangular blocky structure; hard, friable; common very fine and fine roots; soft silty shale, same size as in BW horizon, comprise about 25 percent, by volume; neutral; clear wavy boundary. (13 to 38 centimeters (5 to 15 inches thick)

C—28 to 38 inches; grayish brown (2.5Y 5/2) shaly silty clay loam, light brownish gray (2.5Y 6/2) dry; massive; hard, friable; few very fine and fine roots; 80 percent of material consists of grayish brown soft shales with thin seams of sandstone; soil material is between plates of shale and in seams and pockets; neutral; gradual smooth boundary.

Cr—38 to 48 inches; soft, silty shale with thin, very fine sand component.

Range in Characteristics

Thickness of the solum: 20 to 40 inches
Thickness of the mollic epipedon: 7 to 18 inches
Reaction: Moderately acid to moderately alkaline
Content of clay in the particle-size control section (weighted average): 25 to 35 percent

Content of sand in the particle-size control section (weighted average): 5 to 20 percent
Content of rock fragments in the particle-size control section (weighted average): 35 to 75 percent

A horizon:
Hue—10YR or 2.5Y
Value—2 or 3 moist, 3 to 5 dry
Chroma—2 or 3
Texture—channery, shaly, and stony phases of silty clay loam, clay loam, silt loam, silty clay loam, or silt loam
Content of rock fragments 2 to 75 mm in diameter—15 to 60 percent, by volume
Reaction—moderately acid to mildly alkaline

BW horizon:
Hue—10YR or 2.5Y
Value—3 to 5 moist, 4 to 6 dry
Chroma—2 to 4
Texture—channery, shaly, and stony phases of silty clay loam, clay loam, or silt loam
Content of rock fragments 2 to 75 mm in diameter—25 to 75 percent, by volume
Reaction—moderately acid to moderately alkaline

BC or C horizon:
Hue—10YR or 2.5Y
Value—4 to 6 moist, 5 to 7 dry
Chroma—2 to 6
Texture—channery, shaly, stony; very channery, very shaly, and very stony phases of silty clay loam, clay loam, or silt loam
Content of rock fragments 2 to 75 mm in diameter—35 to 90 percent, by volume

Martin Series

The Martin series consists of deep and very deep, moderately well drained soils that formed in colluvium and/or residuum from interbedded silty and clayey shales, limestone, and clay beds. These soils are on uplands. Slopes range from 0 to 12 percent. The mean annual temperature is 55 degrees F, and the mean annual precipitation is 34 inches.

Taxonomic classification: Fine, smectitic, mesic Aquertic Argiudolls

Typical Pedon

Martin silty clay loam, in a cultivated field about 4.2 miles southwest of Clinton, in Douglas County, Kansas; 1,440 feet north and 1,025 feet west of the southeast corner of sec. 31, T. 14 S., R. 18 E. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 9 inches; very dark brown (10YR 2/2) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; hard, firm, slightly sticky and slightly plastic; slightly acid; gradual smooth boundary.
BA—9 to 14 inches; very dark brown (10YR 2/2) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; most peds have shiny surfaces; medium acid; gradual smooth boundary.
Bt1—14 to 28 inches; very dark grayish brown (10YR 3/2) silty clay, dark grayish brown (10YR 4/2) dry; moderate medium and coarse subangular blocky with

some angular blocky structure; very hard, very firm, very sticky and very plastic; distinct continuous clay films on faces of peds; few fine distinct yellowish brown (10YR 5/4) masses of iron accumulations; common fine black manganese concretions; many fine wormcasts; many root channels filled with black material; medium acid; gradual smooth boundary.

Bt2—28 to 37 inches; dark grayish brown (10YR 4/2) silty clay, olive brown (2.5Y 4/4) crushed, grayish brown (10YR 5/2) dry; moderate medium and coarse angular blocky with some subangular blocky structure; very hard, very firm, very sticky and very plastic; distinct and continuous clay films on faces of peds; few fine prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) masses of iron accumulations; common fine black manganese concretions; wormcasts and root channels as in horizon above; slightly acid; gradual smooth boundary.

BC—37 to 48 inches; grayish brown (10YR 5/2) silty clay, light brownish gray (10YR 6/2) dry; weak coarse and medium angular blocky and subangular blocky structure; very hard, very firm, very sticky and very plastic; clay films on faces of some peds; common coarse prominent strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) masses of iron accumulations; some dark root channels; common fine black manganese concretions; neutral; diffuse boundary.

C—48 to 80 inches; coarsely mottled gray (10YR 5/1), strong brown (7.5YR 5/6), yellowish brown (10YR 5/6), and olive brown (2.5Y 4/4) silty clay; light gray (10YR 6/1), reddish yellow (7.5YR 6/6), brownish yellow (10YR 6/6), and light olive brown (2.5Y 5/4) dry; massive; very hard, very firm, very sticky and very plastic; few fine black manganese concretions; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 36 inches; includes the upper part of the argillic horizon

Carbonates: Generally do not have free carbonates; a few small carbonate concretions in the lower part of the B and C horizons in some pedons

Depth to shale or clay beds: More than 40 inches

Other feature: A bedrock substratum phase is recognized.

A horizon:

Hue—10YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2
Texture—silty clay loam, silty clay, or clay loam
Reaction—moderately acid or slightly acid

Bt horizon:

Hue—10YR or 2.5Y
Value—2 to 4 moist, 3 to 5 dry
Chroma—1 or 2 (upper part); 1 to 4 (lower part)
Texture—clay or silty clay
Content of clay—40 to 55 percent
Reaction—moderately acid to slightly alkaline
Special features—strong brown, reddish brown, and yellowish brown iron accumulations are few and distinct (upper part); common and prominent (lower part)

C horizon:

Hue—5YR to 2.5Y
Texture—clay or silty clay
Reaction—neutral or slightly alkaline

Mason Series

The Mason series consists of very deep, moderately well drained soils that formed in material weathered from silty alluvium of Pleistocene age. These nearly level to gently sloping soils are on broad flood plains in the Cherokee Prairies (MLRA 112). Slopes range from 0 to 3 percent. The mean annual precipitation is 39 inches, and the mean annual air temperature is 59 degrees F.

Taxonomic classification: Fine-silty, mixed, active, thermic Pachic Argiudolls

Typical Pedon

Mason silt loam, in a cultivated area in Washington County, Oklahoma; about 8 miles east of Bartlesville, Oklahoma; 1,290 feet east and 200 feet north of the southwest corner of sec. 16, T. 26N., R. 14 E. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 8 inches; dark brown (10YR 3/3) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; slightly hard, friable; slightly acid; smooth boundary.

A—8 to 14 inches; dark brown (10YR 3/3) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; slightly hard, friable; slightly acid; gradual smooth boundary.

Bt1—14 to 22 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 4/3) dry; moderate medium subangular blocky structure; slightly hard, friable; patchy clay films on faces of peds; slightly acid; gradual smooth boundary.

Bt2—22 to 30 inches; brown (10YR 4/3) silty clay loam, dark yellowish brown (10YR 4/4) dry; moderate medium subangular blocky structure; very hard, firm; nearly continuous clay films on faces of peds; few dark-colored concretions; moderately acid; gradual smooth boundary.

BC—30 to 48 inches; dark yellowish brown (10YR 4/4) clay loam; yellowish brown (10YR 5/4) dry; weak medium subangular blocky structure; hard, firm; moderately acid; gradual smooth boundary.

C—48 to 65 inches; dark yellowish brown (10YR 4/4) clay loam, yellowish brown (10YR 5/4) dry; massive; hard, firm; moderately acid.

Range in Characteristics

Thickness of the mollic epipedon: 11 to 34 inches

Content of clay in the particle-size control section(weighted average): 25 to 35 percent

Content of sand in the particle-size control section(weighted average): 5 to 30 percent

A horizon:

Hue—7.5YR or 10YR
Value—2 or 3
Chroma—2 or 3
Texture—loam, silt loam, silty clay loam, or clay loam
Reaction—strongly acid to neutral

Bt1 horizon:

Hue—7.5YR or 10YR
Value—2 or 3
Chroma—2 or 3
Texture—loam, silt loam, silty clay loam, or clay loam
Reaction—moderately acid to neutral

Bt2 horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—2 to 4
Texture—loam, silt loam, silty clay loam, or clay loam
Reaction—strongly acid to neutral

BC horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—2 to 4
Redoximorphic features—shades of brown, red, or gray
Texture—loam, silt loam, silty clay loam, or clay loam
Reaction—strongly acid to neutral

C horizon:
Hue—5YR to 10YR
Value—4 or 5
Chroma—2 to 4
Texture—loam, silt loam, clay loam, or silty clay loam, or it has strata of these textures
Redoximorphic features—shades of brown, red, or gray
Reaction—very strongly acid to slightly alkaline

Morrill Series

The Morrill series consists of very deep, well drained soils that formed in loamy glacial till or outwash deposits. These soils are on uplands. Slopes range from 1 to 30 percent. The mean annual precipitation is about 37 inches, and the mean annual temperature is about 53 degrees F.

Taxonomic classification: Fine-loamy, mixed, superactive, mesic Typic Argiudolls

Typical Pedon

Morrill loam, in an area of grassland about 5 miles east and 2.5 miles north of Hiawatha, in Brown County, Kansas; 2,475 feet north and 630 feet west of the southeast corner of sec. 7, T. 2 S., R. 18 E. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 4/3) dry; moderate medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; 2 percent mixed pebbles; very strongly acid; clear smooth boundary.

BA—6 to 12 inches; dark brown (10YR 3/3 and 7.5YR 3/4) loam, brown (10YR 4/3) dry; moderate medium granular structure; hard, firm, slightly sticky and slightly plastic; common fine roots; 2 percent mixed pebbles; strongly acid; gradual smooth boundary.

Bt1—12 to 22 inches; dark reddish brown (5YR 3/4) loam, strong brown (7.5YR 4/6) dry; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine roots; many faint discontinuous clay films on faces of peds; 2 percent mixed pebbles; moderately acid; gradual smooth boundary.

Bt2—22 to 30 inches; reddish brown (5YR 4/4) sandy clay loam, brown (7.5YR 5/4) dry; moderate medium subangular blocky structure; hard, firm, sticky and slightly plastic; common fine roots; many faint discontinuous clay films on faces of peds; 2 percent mixed pebbles; moderately acid; gradual wavy boundary.

Bt3—30 to 35 inches; yellowish red (5YR 4/6) and brown (7.5YR 4/4) sandy clay loam, strong brown (7.5YR 5/6) dry; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine roots; common faint patchy clay films on faces of peds; 2 percent mixed pebbles; slightly acid; gradual wavy boundary.

Bt4—35 to 43 inches; brown (7.5YR 4/4) and strong brown (7.5YR 4/6) sandy clay loam, strong brown (7.5YR 5/6) dry; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; few faint patchy clay films on faces of peds; few medium yellowish red (5YR 4/6) relict iron stains; 2 percent mixed pebbles; slightly acid; clear wavy boundary.

BC—43 to 52 inches; strong brown (7.5YR 4/4) fine sandy loam, reddish yellow (7.5YR 6/6) dry; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common medium yellowish red (5YR 4/6) relict iron stains; 2 percent mixed pebbles; slightly acid; clear wavy boundary.

2C1—52 to 59 inches; strong brown (7.5YR 4/6) fine sandy loam, reddish yellow (7.5YR 6/6) dry; massive; slightly hard, very friable, slightly sticky and nonplastic; many fine yellowish red (5YR 4/6) relict iron stains; 2 percent mixed pebbles; slightly acid; clear wavy boundary.

2C2—59 to 73 inches; strong brown (7.5YR 4/6) loamy fine sand, reddish yellow (7.5YR 6/6) dry; single grain; loose, nonsticky and nonplastic; common coarse strong brown (7.5YR 5/8) and yellowish red (5YR 5/6) relict iron stains; 2 percent mixed pebbles; slightly acid; gradual smooth boundary.

2C3—73 to 80 inches; strong brown (7.5YR 5/6) sand, reddish yellow (7.5YR 6/6) dry; single grain; loose, nonsticky and nonplastic; common coarse and very coarse rounded clay bodies throughout; 2 percent mixed pebbles; slightly acid.

Range in Characteristics

Soil moisture regime: Udic

Depth to the argillic horizon: 6 to 23 inches

Thickness of the mollic epipedon: 10 to 20 inches

Thickness of the solum: 30 to 60 inches

Content of clay in the particle-size control section (weighted average): 18 to 35 percent

Content of sand in the particle-size control section (weighted average): More than 20 percent

Other feature: A stony phase is recognized.

A horizon:

Hue—10YR or 7.5YR
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 to 3
Texture—loam, clay loam, stony loam, or very stony loam
Content of clay—15 to 35 percent
Content of rock fragments—0 to 14 percent pebbles, by volume
Reaction—neutral to very strongly acid

Bt horizon:

Hue—7.5YR or 5YR
Value—3 or 4 moist, 4 or 5 dry
Chroma—3 to 6
Texture—loam, clay loam, sandy clay loam, gravelly clay loam, or gravelly sandy clay loam
Content of clay—18 to 35 percent

Content of rock fragments—0 to 20 percent pebbles
Reaction—neutral to very strongly acid

2C or C horizon:
Hue—10YR, 7.5YR, or 5YR
Value—4 or 5 moist, 4 to 6 dry
Chroma—3 to 6
Texture—loam, clay loam, fine sandy loam, sandy loam, sandy clay loam, gravelly loam, gravelly clay loam, gravelly sandy loam, gravelly sandy clay loam, loamy fine sand, or sand; strata of clay in a few pedons
Content of clay—5 to 30 percent
Content of rock fragments—0 to 20 percent pebbles
Reaction—neutral to very strongly acid

Muscotah Series

The Muscotah series consists of very deep, somewhat poorly drained soils that formed in clayey alluvium. Muscotah soils are on flood plains. Slopes range from 0 to 2 percent. The mean annual precipitation is about 34 inches, and the mean annual air temperature is about 53 degrees F.

Taxonomic classification: Fine, smectitic, mesic Cumulic Hapludolls

Typical Pedon

Muscotah silty clay loam, in a cultivated area in Brown County, Kansas; about 4 miles south and 1 mile west of Muscotah; 230 feet west and 500 feet north of the southeast corner of sec. 18, T. 4 S., R. 16 E. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, very dark grayish brown (10YR 3/2) dry; moderate fine granular structure; hard, friable, slightly sticky and slightly plastic; common fine roots throughout; neutral; clear wavy boundary.

A1—9 to 16 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine subangular blocky structure; very hard, friable, sticky and plastic; few very fine roots throughout; neutral; gradual smooth boundary.

A2—16 to 23 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine subangular blocky structure; very hard, firm, sticky and plastic; few very fine roots throughout; few fine prominent yellowish brown (10YR 5/6) soft masses of iron accumulation; neutral; clear smooth boundary.

Bw1—23 to 35 inches; black (10YR 2/1) silty clay, very dark gray (10YR 3/1) dry; moderate fine subangular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots throughout; few distinct slickensides; common fine prominent yellowish brown (10YR 5/6) soft masses of iron accumulation; neutral; gradual smooth boundary.

Bw2—35 to 44 inches; black (10YR 2/1) silty clay, very dark gray (10YR 3/1) dry; moderate medium subangular blocky structure; very hard, very firm, very sticky and very plastic; common distinct slickensides; common fine distinct dark yellowish brown (10YR 4/4) soft masses of iron accumulation; neutral; gradual smooth boundary.

Bw3—44 to 60 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; very hard, very firm, very sticky and very plastic; common distinct slickensides; few fine rounded iron-manganese concretions; common fine faint very dark grayish brown (10YR 3/2) iron depletions; neutral; gradual wavy boundary.

Bw4—60 to 70 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry;

weak medium subangular blocky structure; very hard, very firm, very sticky and very plastic; common distinct discontinuous intersecting slickensides; few fine rounded iron-manganese concretions, and few medium irregular carbonate nodules; common medium distinct dark grayish brown (2.5Y 4/2) iron depletions; neutral; gradual wavy boundary.

Bg—70 to 80 inches; olive gray (5Y 4/2) silty clay, olive gray (5Y 5/2) dry; weak medium subangular blocky structure; very hard, very firm, very sticky and very plastic; free water at a depth of 75 inches; common distinct discontinuous intersecting slickensides; common fine prominent olive brown (2.5Y 4/4) soft masses of iron accumulation; few fine rounded iron-manganese concretions, and common fine and medium irregular carbonate nodules; neutral.

Range in Characteristics

Soil moisture regime: Udic
Depth to secondary calcium carbonate: More than 30 inches
Depth to redoximorphic concentrations: 16 to 24 inches
Thickness of the mollic epipedon: More than 36 inches
Content of clay in the particle-size control section (weighted average): 35 to 50 percent
Content of sand in the particle-size control section (weighted average): Less than 20 percent
Other features: Cg horizons are in some pedons.

A horizon:
Hue—10YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2
Texture—silty clay loam; silty overwash phase is recognized
Content of clay—27 to 40 percent; 18 to 27 percent (silty overwash)
Reaction—moderately acid to neutral

Bw horizon:
Hue—10YR or 2.5Y
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 or 2
Texture—silty clay loam or silty clay
Content of clay—35 to 50 percent
Content of sand—less than 10 percent
Reaction—moderately acid to slightly alkaline

Bg horizon:
Hue—2.5Y to 5Y
Value—2 to 5 moist, 3 to 6 dry
Chroma—1 or 2
Texture—silty clay loam or silty clay
Content of clay—35 to 50 percent
Content of sand—less than 10 percent
Reaction—neutral or slightly alkaline

Osage Series

The Osage series consist of very deep, poorly drained soils that formed in thick clayey alluvium. These soils are on flood plains along major streams. Slopes range from 0 to 2 percent. The mean annual temperature is 61 degrees F, and the mean annual precipitation is 39 inches.

Taxonomic classification: Fine, smectitic, thermic Typic Epiaquerts

Typical Pedon

Osage silty clay, in a level area of a cultivated field in Vernon County, Missouri; 100 feet north and 100 feet east of the center of sec. 35, T. 38 N., R. 31 W. (Colors are for moist soil unless otherwise indicated.)

Ap1—0 to 4 inches; very dark gray (10YR 3/1) rubbed silty clay, gray (10YR 5/1) rubbed, dry; moderate fine granular structure; firm, moderately sticky and moderately plastic; many very fine and fine roots throughout; many fine and medium high continuity interstitial pores; common fine irregular yellowish brown (10YR 5/8) masses of iron accumulation between peds; moderately acid; abrupt smooth boundary.

Ap2—4 to 8 inches; very dark gray (10YR 3/1) rubbed silty clay, gray (10YR 5/1) rubbed, dry; weak coarse angular blocky structure; extremely firm, very sticky and very plastic; common very fine roots between peds; common very fine low continuity tubular pores and few medium low continuity tubular pores; common fine irregular reddish brown (5YR 4/4) masses of iron accumulation between peds; slightly acid; abrupt smooth boundary.

A—8 to 13 inches; very dark gray (10YR 3/1) rubbed clay, gray (10YR 5/1) rubbed, dry; moderate fine and medium angular blocky structure; extremely firm, very sticky and very plastic; common very fine roots between peds; common very fine low continuity tubular pores and few medium low continuity tubular pores; few fine rounded strong brown (7.5YR 5/8) masses of iron accumulation between peds; slightly acid; clear smooth boundary.

Bss1—13 to 23 inches; very dark gray (10YR 3/1) rubbed clay, gray (10YR 5/1) rubbed, dry; moderate medium prismatic structure parting to moderate fine and medium angular blocky; extremely firm, very sticky and very plastic; common very fine roots between peds; common very fine and fine low continuity tubular pores; few distinct continuous intersecting slickensides on faces of peds; many medium irregular yellowish brown (10YR 5/6) masses of iron accumulation between peds and few medium rounded black (N 2/0) iron-manganese concretions throughout; moderately acid; clear wavy boundary.

Bgss2—23 to 36 inches; dark gray (2.5Y 4/1) interior clay; moderate medium prismatic structure parting to moderate medium subangular blocky; very firm, very sticky and very plastic; common very fine roots between peds; common very fine and fine low continuity tubular pores; many prominent continuous intersecting slickensides on faces of peds; many medium irregular yellowish brown (10YR 5/6) masses of iron accumulation between peds and few fine rounded black (N 2/0) iron-manganese concretions between peds; slightly acid; gradual wavy boundary.

Bgss3—36 to 45 inches; dark gray (2.5Y 4/1) interior, clay; moderate medium prismatic structure parting to moderate medium subangular blocky; very firm, very sticky and very plastic; few very fine roots between peds; common very fine and fine low continuity tubular pores; common prominent continuous intersecting slickensides on faces of peds; many coarse irregular yellowish brown (10YR 5/6) masses of iron accumulation between peds; slightly acid; gradual wavy boundary.

Bgss4—45 to 60 inches; very dark gray (2.5Y 3/1) interior clay; moderate medium subangular blocky structure; very firm, very sticky and very plastic; few very fine roots between peds; common very fine and fine low continuity tubular pores; few distinct continuous intersecting slickensides on faces of peds; many coarse irregular yellowish brown (10YR 5/6) masses of iron accumulation between peds; slightly acid; gradual wavy boundary.

Bg—60 to 80 inches; dark gray (5Y 4/1) interior silty clay; moderate medium

subangular blocky structure; firm, very sticky and very plastic; common very fine and fine low continuity tubular pores; many coarse irregular yellowish brown (10YR 5/6) masses of iron accumulation between peds; neutral.

Range in Characteristics

Thickness of the solum: 40 to 60 inches or more

A horizon:
Hue—10YR or 2.5Y
Value—2 or 3 moist, 4 or 5 dry
Chroma—1 or 2
Redoximorphic features—none to common iron accumulations; none to common iron-manganese accumulations
Texture—silty clay loam, silty clay, or clay
Content of rock fragments—0 to 7 percent gravel
Reaction—slightly acid to moderately alkaline

Bgss horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 moist, 4 or 5 dry
Chroma—2 or less
Redoximorphic features—few to common iron accumulations in shades of brown or yellow; none to common iron-manganese accumulations
Calcium carbonate—none to common carbonate concretions
Texture—clay or silty clay
Content of clay—40 to 60 percent
Content of sand—less than 5 percent
Content of rock fragments—0 to 7 percent
Reaction—moderately acid to neutral (upper part); slightly acid to moderately alkaline (lower part)

Oska Series

The Oska series consists of moderately deep, well drained soils that formed in residuum derived from limestone. These soils are on uplands. Slopes range from 1 to 9 percent. The mean annual precipitation is about 34 inches, and the mean annual temperature is about 54 degrees F.

Taxonomic classification: Fine, smectitic, mesic Vertic Argiudolls

Typical Pedon

Oska silty clay loam, 4 percent slopes, in an area of pasture in Douglas County, Kansas; about 1.5 miles south and 4.25 miles west of Lawrence; 900 feet south and 2,600 feet west of the northeast corner of sec. 30, T. 13 S., R. 19 E.; USGS Lawrence West topographic quadrangle; lat. 38 degrees 53 minutes 46 seconds N. and long. 95 degrees 20 minutes 37 seconds W. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 5 inches; dark brown (7.5YR 3/2) silty clay loam, brown (7.5YR 4/2) dry; moderate medium subangular blocky structure parting to moderate fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots throughout; moderately acid; abrupt smooth boundary.

BA—5 to 11 inches; dark brown (7.5YR 3/2) silty clay, brown (7.5YR 4/2) dry; moderate medium subangular blocky structure parting to moderate fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots throughout; moderately acid; clear smooth boundary.

Bt1—11 to 20 inches; dark brown (7.5YR 3/4) silty clay, brown (7.5YR 4/4) dry; moderate medium subangular blocky structure parting to moderate fine subangular blocky; very hard, firm, very sticky and very plastic; many very fine and fine roots throughout; common very fine tubular pores; few faint discontinuous dark brown (7.5YR 3/3) clay films on faces of peds; 3 percent subangular mixed gravel; moderately acid; clear smooth boundary.

Bt2—20 to 31 inches; dark reddish brown (5YR 3/4) silty clay, reddish brown (5YR 4/4) dry; strong medium subangular blocky structure parting to strong fine subangular blocky; very hard, firm, very sticky and very plastic; many very fine and fine roots throughout; many very fine tubular pores; many distinct discontinuous dark reddish brown (5YR 3/3) clay films throughout and few prominent discontinuous dark reddish brown (5YR 3/2) organic coats on faces of peds; common fine rounded black (N 2/0) slightly hard iron-manganese concretions between peds; 3 percent subangular mixed gravel and 3 percent subangular mixed cobbles; strongly acid; gradual wavy boundary.

Bt3—31 to 38 inches; dark reddish brown (5YR 3/4) silty clay, reddish brown (5YR 4/4) dry; strong medium subangular blocky structure parting to strong fine subangular blocky; very hard firm, very sticky and very plastic; many very fine and fine roots throughout; many very fine tubular pores; many distinct discontinuous dark reddish brown (5YR 3/3) clay films throughout and few prominent discontinuous dark reddish brown (5YR 3/2) organic coats on faces of peds; common fine rounded black (N 2/0) slightly hard iron-manganese concretions between peds; 3 percent subangular mixed gravel and 3 percent subangular mixed cobbles; moderately acid; gradual wavy boundary.

R—38 inches; limestone bedrock.

Range in Characteristics

Thickness of the mollic epipedon: 8 to 20 inches
Depth to lithic contact: 20 to 40 inches to bedrock
Depth to the argillic horizon: 10 to 15 inches
Particle-size control section (weighted average): 41 percent
Content of clay in the particle-size control section (weighted average): 35 to 60 percent
Content of sand in the particle-size control section (weighted average): 0 to 10 percent

A horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—1 to 3
Texture—silty clay loam or silt loam
Content of clay—20 to 35 percent
Reaction—strongly acid to neutral

BA horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—2 or 3
Texture—silty clay loam or silty clay
Content of clay—20 to 50 percent
Reaction—strongly acid to neutral

Bt horizon:
Hue—7.5YR or 5YR
Value—3 to 5 moist, 4 to 6 dry
Chroma—2 to 6

Texture—silty clay or silty clay loam
Content of clay—35 to 50 percent
Reaction—strongly acid to neutral

Pawnee Series

The Pawnee series consists of very deep, moderately well drained soils that formed in glacial till. These soils are on uplands. Slopes range from 0 to 12 percent. The mean annual precipitation is about 30 inches, and the mean annual temperature is about 54 degrees F.

Taxonomic classification: Fine, smectitic, mesic Oxyaquic Vertic Argiudolls

Typical Pedon

Pawnee loam, in a cultivated area about 4 miles north of Pawnee City, in Pawnee County, Nebraska; 1,585 feet west and 350 feet south of the northeast corner of sec. 2, T. 2 N., R. 11 E.; Steinauer USGS topographic quadrangle; lat. 40 degrees 10 minutes 27 seconds N. and long. 96 degrees 08 minutes 05 seconds W. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 6 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; moderate fine and very fine granular structure; many fine and medium and few coarse roots throughout; common fine tubular pores; slightly hard, friable; moderately acid; abrupt smooth boundary.

A—6 to 10 inches; very dark brown (10YR 2/2) clay loam, very dark grayish brown (10YR 3/2) dry; moderate medium granular structure; many fine and medium and few coarse roots throughout; common fine tubular pores; slightly hard, friable; moderately acid; clear smooth boundary.

BA—10 to 14 inches; dark brown (10YR 3/3) clay loam, dark yellowish brown (10YR 3/4) dry; moderate fine and medium subangular blocky structure; hard, friable; common fine and few medium roots throughout; common fine tubular pores; few fine prominent dark reddish brown (5YR 3/4) iron masses; moderately acid; gradual smooth boundary.

Bt1—14 to 24 inches; dark grayish brown (10YR 4/2) clay, brown (10YR 4/3) dry; moderate medium and coarse subangular blocky structure; extremely hard, very firm; common fine and few medium roots throughout; common fine tubular pores; thin continuous organic coatings on faces of peds; 2 percent gravel, by volume; few fine and medium prominent reddish brown (5YR 4/4) iron masses; slightly acid; gradual smooth boundary.

Bt2—24 to 32 inches; brown (10YR 4/3) clay, dark yellowish brown (10YR 4/4) dry; weak coarse subangular blocky structure; extremely hard, very firm; few fine and medium roots throughout; few fine tubular pores; thin continuous organic coatings on faces of peds; 2 percent gravel, by volume; common medium faint grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) and prominent reddish brown (5YR 5/4) iron masses; neutral; gradual smooth boundary.

Bt3—32 to 45 inches; olive brown (2.5Y 4/4) clay, light olive brown (2.5Y 5/4) dry; weak coarse subangular blocky structure; very hard, very firm; few fine and medium roots throughout; few fine tubular pores; thin patchy organic coatings on faces of peds; 2 percent gravel, by volume; many medium distinct grayish brown (10YR 5/2) and prominent brown (7.5YR 5/4) iron masses; moderately alkaline; gradual smooth boundary.

BC—45 to 53 inches; mixed grayish brown (2.5Y 5/2) and yellowish brown (10YR 5/6) clay, light olive brown (2.5Y 5/4) and dark yellowish brown (10YR 4/4) dry; weak medium subangular blocky structure; very hard, very firm; few fine and medium roots throughout; few fine tubular pores; few medium lime concretions; 2

percent gravel, by volume; many medium prominent dark brown (7.5YR 4/4) iron masses; moderately alkaline; clear smooth boundary.

C—53 to 80 inches; grayish brown (2.5Y 5/2) clay loam, light olive brown (2.5Y 5/4) dry; massive; small iron and manganese concretions; 2 percent gravel, by volume; few medium and large soft masses of lime; many coarse distinct grayish brown (10YR 5/2) iron masses; moderately alkaline.

Range in Characteristics

Soil moisture regime: Udic; the soil moisture control section is wet from March through May.
Mean annual soil temperature: 51 to 56 degrees F
Depth to argillic horizon: 7 to 19 inches
Depth to secondary calcium carbonate: 29 to 54 inches
Depth to redoximorphic concentrations: 7 to 13 inches
Depth to episaturation: 12 to 36 inches from March through May
Thickness of the mollic epipedon: 10 to 19 inches; commonly includes the upper part of the B horizon
Thickness of the solum: 40 to 60 inches
Content of clay in the particle-size control section (weighted average): 40 to 48 percent
Content of sand in the particle-size control section (weighted average): 20 to 45 percent
Content of rock fragments in the particle-size control section (weighted average): 0 to 5 percent, by volume
Size of rock fragments in the particle-size control section: Gravel
Other features: Some pedons have a BA horizon.

A horizon:
Hue—10YR
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 or 2
Texture—loam, clay loam, or clay
Content of clay—15 to 41 percent
Reaction—moderately acid to neutral

Bt horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 5 moist, 3 to 6 dry
Chroma—2 to 4
Redoximorphic concentrations—hue of 7.5YR or 5YR, value of less than 5, and chroma of less than 6
Texture—clay
Content of clay—40 to 48 percent
Content of rock fragments—0 to 5 percent gravel
Reaction—slightly acid to moderately alkaline

BC horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6, moist or dry
Chroma—2 to 6
Redoximorphic concentrations—hue of 7.5YR or 5YR, value of less than 5, and chroma of less than 4
Texture—clay
Content of clay—40 to 48 percent
Content of rock fragments—0 to 5 percent gravel
Reaction—slightly alkaline or moderately alkaline

C horizon:

Hue—10YR, 2.5Y, 5Y, or N
Value—5 moist, 5 or 6 dry
Chroma—0 to 4
Redoximorphic concentrations—hue of 10YR, 7.5YR, or 5YR; value of less than 5; and chroma of less than 4
Texture—clay loam, sandy clay loam, or loam
Content of clay—15 to 40 percent
Content of rock fragments—0 to 5 percent, by volume
Reaction—slightly alkaline or moderately alkaline

Reading Series

The Reading series consists of very deep, well drained or moderately well drained soils that formed in silty alluvium. These soils are on flood-plain steps and stream terraces. The mean annual temperature is 55 degrees F, and the mean annual precipitation is 33 inches.

Taxonomic classification: Fine-silty, mixed, superactive, mesic Pachic Argiudolls

Typical Pedon

Reading silty clay loam, in a cultivated field 0.2 mile east of the Shawnee-Wabaunsee County line on Kansas Highway #4, in Shawnee County, Kansas; 1,200 feet east and 2,540 feet south of the northwest corner of sec. 35, T. 12 S., R. 13 E.; Dover USGS topographic quadrangle; lat. 38 degrees 57 minutes 53 seconds N. and long. 95 degrees 56 minutes 35 seconds W. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; moderately acid; abrupt smooth boundary.

A—6 to 14 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; moderately acid; gradual smooth boundary.

Bt1—14 to 22 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 4/3) dry; moderate fine subangular blocky and angular blocky structure; hard, firm, sticky and plastic; few distinct patchy continuous clay films on face of peds; moderately acid; gradual smooth boundary.

Bt2—22 to 40 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 4/3) dry; moderate medium and fine subangular blocky and angular blocky structure; hard, firm, sticky and plastic; common distinct continuous clay films on faces of peds; slightly acid; gradual smooth boundary.

Bt3—40 to 56 inches; dark yellowish brown (10YR 4/4) silty clay loam, yellowish brown (10YR 5/4) dry; weak fine subangular blocky structure; hard, firm, sticky and plastic; few distinct patchy clay films on faces of peds; slightly acid; diffuse boundary.

C—56 to 80 inches; dark yellowish brown (10YR 4/4) silty clay loam, yellowish brown (10YR 5/4) dry; massive; hard, firm, sticky and plastic; neutral.

Range in Characteristics

Depth to argillic horizon: 10 to 20 inches
Depth to calcium carbonate: 40 to 80 inches
Thickness of the mollic epipedon: 16 to 34 inches

Depth to redoximorphic concentrations: 36 to 50 inches; dark yellowish brown iron-manganese concentrations in some pedons
Particle-size control section (weighted average): 14 to 34 inches
Content of clay in the particle-size control section (weighted average): 27 to 35 percent
Other features: Some pedons have a BC horizon.

A horizon:
Hue—10YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—1 to 3
Texture—silt loam or silty clay loam
Content of clay—20 to 32 percent
Reaction—moderately acid to neutral

Bt horizon:
Hue—10YR
Value—2 to 4 moist, 4 to 6 dry
Chroma—1 to 4
Texture—silty clay loam
Content of clay—27 to 35 percent
Reaction—moderately acid to slightly alkaline

BC horizon:
Hue—10YR
Value—4 to 6 moist, 5 to 7 dry
Chroma—2 to 4
Texture—silt loam or silty clay loam
Content of clay—18 to 35 percent
Reaction—moderately acid to slightly alkaline

C horizon:
Hue—10YR
Value—4 to 6 moist, 5 to 7 dry
Chroma—1 to 4
Texture—silt loam or silty clay loam
Content of clay—18 to 35 percent
Calcium carbonate equivalent—0 to 5 percent
Reaction—moderately acid to moderately alkaline

Sharpsburg Series

The Sharpsburg series consists of deep, moderately well drained soils that formed in loess on uplands and high benches. Slopes range from 0 to 18 percent. The mean annual temperature is about 51 degrees F, and the mean annual precipitation is about 32 inches.

Taxonomic classification: Fine, smectitic, mesic Typic Argiudolls

Typical Pedon

Sharpsburg silty clay loam, with a convex slope of 8 percent, in a cultivated area in Taylor County, Iowa; about 8 miles north and 5 miles east of Bedford; 1,870 feet east and 540 feet south of the northwest corner of sec. 10, T. 69 N., R. 33 W. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2)

dry; weak fine subangular blocky structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

A1—8 to 11 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate very fine subangular blocky structure; friable; slightly acid; clear smooth boundary.

A2—11 to 17 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; some brown (10YR 4/3) peds; moderate very fine subangular blocky structure; friable; medium acid; gradual smooth boundary.

Bt1—17 to 24 inches; brown (10YR 4/3) silty clay loam; very dark gray (10YR 3/1) coatings on faces of peds; moderate fine subangular blocky structure parting to weak fine subangular blocky; firm; common distinct very dark grayish brown (10YR 3/2) clay films; very few fine roots; medium acid; gradual smooth boundary.

Bt2—24 to 31 inches; brown (10YR 4/3) and yellowish brown (10YR 5/4) silty clay loam; few fine prominent light brownish gray (2.5Y 6/2) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; firm; many distinct dark grayish brown (10YR 4/2) clay films; very few fine and medium roots; few fine dark concretions (iron and manganese oxides); medium acid; gradual smooth boundary.

Bt3—31 to 38 inches; brown (10YR 5/3) silty clay loam; common medium distinct light brownish gray (2.5Y 6/2) and strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; many prominent grayish brown (10YR 5/2) clay films; few fine dark concretions (iron and manganese oxides); medium acid; gradual smooth boundary.

BC—38 to 46 inches; yellowish brown (10YR 5/4) silty clay loam; many fine and medium distinct grayish brown (2.5Y 5/2) and common medium prominent strong brown (7.5YR 5/8) mottles; weak medium prismatic structure; firm; common distinct grayish brown (10YR 5/2) clay films; few fine dark concretions (iron and manganese oxides); medium acid; gradual smooth boundary.

C—46 to 60 inches; mottled grayish brown (2.5Y 5/2), yellowish brown (10YR 5/4), and strong brown (7.5YR 4/4) silty clay loam; massive; firm; very few fine roots; common fine dark concretions (iron and manganese oxides); slightly acid.

Range in Characteristics

Soil moisture regime: Udic

Thickness of the solum: 36 to 72 inches

Reaction: Moderately acid or strongly acid in the most acid part

Other features: Thickness of the A horizon, depth to clay maximum, maximum percent clay, thickness of the Bt horizon, depth to grayish mottles, and solum thickness decrease as gradient increases on convex slopes; there are no free carbonates within the solum.

Ap or A horizon:

Hue—10YR
Value—1 or 2 moist, 2 or 3 dry
Chroma—2 or 3
Texture—silt loam or silty clay loam
Content of clay—25 to 34 percent
Content of sand—1 to 5 percent
Reaction—slightly acid or neutral

Bt horizon (upper part):

Hue—10YR
Value—4 or 5

Chroma—3 or 4
Texture—silty clay loam
Content of clay—36 to 42 percent
Content of sand—1 to 5 percent
Reaction—moderately acid or slightly acid
Special features—pedons having colors in the matrix of 5 or 6 value and 2 chroma at depths of less than 32 inches are outside the range of the Sharpsburg series.

Bt horizon (lower part):
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam
Content of sand—1 to 5 percent
Reaction—moderately acid to neutral

BC horizon (if it occurs) and C horizon:
Hue—7.5YR to 5Y
Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam or silt loam
Content of sand—1 to 5 percent
Reaction—strongly acid to neutral

Shidler Series

The Shidler series consists of very shallow and shallow, well drained upland soils that formed in material weathered from limestone and chert of Permian and Pennsylvanian age. These soils are on nearly level to sloping convex uplands in the Bluestem Hills (MLRA 76). Slopes are 0 to 8 percent. The mean annual precipitation is 36 inches, and the mean annual temperature is 60 degrees F.

Taxonomic classification: Loamy, mixed, active, thermic Lithic Haplustolls

Typical Pedon

Shidler flaggy silty clay loam, in an area of rangeland in Osage County, Oklahoma; about 2 miles west and 1 mile south of Pawhuska; 600 feet south and 50 feet east of the northwest corner of sec. 18, T 25 N., R. 9 E. (Colors are for dry soil unless otherwise indicated.)

A1—0 to 7 inches; very dark grayish brown (10YR 3/2) flaggy silty clay loam; very dark brown (10YR 2/2) moist; strong fine and medium granular structure; hard, friable; limestone fragments make up 30 percent, by volume; slightly alkaline; abrupt irregular boundary.
R—7 to 20 inches; gray (10YR 6/1) hard fractured limestone; fractures are 5 mm wide and occur at intervals of about 60 cm; fractures contain soil material similar to the horizon above and extend to a depth of 46 cm.

Range in Characteristics

Thickness of the solum: 4 to 20 inches
Thickness of the mollic epipedon: 4 to 20 inches
Other features: Some pedons are calcareous and moderately alkaline just above the bedrock.

Content of clay in the particle-size control section (weighted average): 18 to 35 percent

A horizon:
Hue—5YR to 10YR
Value—3 to 5
Chroma—0 to 3
Texture—silt loam, silty clay loam, flaggy silt loam, flaggy silty clay loam, stony silt loam, or stony silty clay loam
Content of clay—18 to 35 percent
Content of rock fragments more than 2 mm in diameter—0 to 35 percent limestone or chert, by volume
Content of rock fragments less than 2 mm in diameter—0 to 30 percent, by volume
Content of rock fragments more than 76 mm in diameter—0 to 30 percent, by volume
Reaction—slightly acid to slightly alkaline

R layer:
Kind of bedrock—grayish or brownish limestone, fractured vertically at intervals, from 30 to 180 cm.; fractures range from 1 to 150 mm wide to a depth of 40 to 60 cm.; horizontal bedding planes from 5 to 122 cm. apart, but commonly are 10 to 20 cm.
Thickness of bedrock—0.6 meter to several meters

Sibleyville Series

The Sibleyville series consists of moderately deep, well drained soils that formed in residuum derived from sandstone and silty and sandy shale. These soils are on uplands. Slopes range from 1 to 12 percent. The mean annual precipitation is 33 inches, and the mean annual temperature is 55 degrees F.

Taxonomic classification: Fine-loamy, mixed, superactive, mesic Typic Argiudolls

Typical Pedon

Sibleyville loam, in an area of grassland in Douglas County, Kansas, six miles east of Baldwin; 800 feet west and 60 feet north of the southeast corner of sec. 33, T. 14 S., R. 21 E. (Colors are for moist soil unless otherwise indicated.)

A1—0 to 7 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; slightly hard, very friable; a few small sandstone fragments; slightly acid; gradual smooth boundary.
B2t—7 to 15 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; moderate fine and medium granular structure; slightly hard, very friable; thin clay films on faces of peds; few small sandstone fragments; medium acid; clear smooth boundary.
C—15 to 27 inches; yellowish brown (10YR 5/4) channery loam, light yellowish brown (10YR 6/4) dry; massive; slightly hard, friable; medium acid; abrupt irregular boundary.
Cr—27 to 60 inches; partially weathered, yellowish brown fine grained sandstone.

Range in Characteristics

Thickness of the solum: 14 to 34 inches
Depth to sandstone or sandy and silty shale: 20 to 40 inches
Thickness of the mollic epipedon: 7 to 20 inches
Reaction: Strongly acid to neutral throughout

Content of coarse fragments 2 mm to 3 inches in diameter: 0 to 10 percent, by volume
Other feature: Some pedons have a B1 horizon.

A horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 3 to 5 dry
Chroma—2 or 3
Texture—loam, fine sandy loam, or clay loam
Reaction—neutral to moderately acid

B2 horizon:
Hue—5YR, 7.5YR, or 10YR
Value—3 to 5 moist, 5 to 7 dry
Chroma—2 to 4
Texture—loam, clay loam, or sandy clay loam
Content of clay—20 to 35 percent

C horizon:
Hue—10YR, 7.5YR, or 5YR
Value—4 to 6 moist, 5 to 7 dry
Chroma—3 to 6
Texture—loam, clay loam, fine sandy loam, sandy clay loam, channery loam, channery clay loam, or channery sandy clay loam

Sogn Series

The Sogn series consists of shallow and very shallow, somewhat excessively drained soils that formed in residuum derived from limestone. These soils are on uplands. Slopes range from 0 to 20 percent. The mean annual precipitation is about 32 inches, and the mean annual temperature is about 55 degrees F.

Taxonomic classification: Loamy, mixed, superactive, mesic Lithic Haplustolls

Typical Pedon

Sogn silty clay loam, in an area of rangeland about 10 miles east and 1 mile south of Junction City, in Geary County, Kansas; 300 feet east and 50 feet south of the northwest corner of sec. 15, T. 12 S., R. 7 E. (Colors are for dry soil unless otherwise indicated.)

A—0 to 9 inches; very dark gray (10YR 3/1) silty clay loam, black (10YR 2/1) moist; moderate medium granular structure; hard, friable; few fragments of weathered limestone in the lower 3 inches making up less than 15 percent of the soil volume; strong effervescence; moderately alkaline; abrupt smooth boundary.
R—9 inches; level-bedded, indurated limestone that has joints averaging about 18 inches apart and less than 1/4 inch wide; cracks are filled with dark colored soil.

Range in Characteristics

Soil moisture regime: Ustic bordering on Udic
Depth to lithic contact: 4 to 20 inches to limestone bedrock
Thickness of the mollic epipedon: 4 to 20 inches
Content of clay in the particle-size control section (weighted average): 20 to 35 percent
Content of sand in the particle-size control section (weighted average): 2 to 35 percent

Content of rock fragments in the particle-size control section (weighted average):
Less than 35 percent
Size of rock fragments in the particle-size control section: Pebbles or channers
Kind of rock fragments in the particle-size control section: Limestone
Other features: Some pedons do not contain free carbonates above the bedrock; some pedons have an AC or C horizon, that has colors similar to those of the A horizon and is channery silt loam or channery silty clay loam.

A horizon:
Hue—7.5YR to 2.5Y
Value—3 to 5 dry, 2 or 3 moist
Chroma—1 to 3, dry or moist
Texture—silty clay loam, loam, silt loam, or clay loam
Content of clay—20 to 35 percent
Content of rock fragments—less than 35 percent
Reaction—slightly acid to moderately alkaline

Stonehouse Series

The Stonehouse series consists of very deep, excessively drained soils that formed in stratified sandy alluvium on flood-plain steps. Slope ranges from 0 to 3 percent. The mean annual temperature is about 55 degrees F, and the mean annual precipitation is about 33 inches.

Taxonomic classification: Sandy, mixed, mesic Typic Udifluvents

Typical Pedon

Stonehouse-Eudora, overwash, complex, in a cultivated field in Jefferson County, Kansas; about 2.25 miles south and 1 mile east of Perry; 1,100 feet south and 2,000 feet east of the northwest corner of sec. 1, T. 11 N., R. 18 E.; USGS Perry topographic quadrangle, lat. 39 degrees 02 minutes 33 seconds N. and long. 95 degrees 21 minutes 57 seconds W. (Colors are moist soil unless otherwise indicated.)

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) loamy sand, light brownish gray (10YR 6/2) dry; single grain; loose, nonsticky and nonplastic; common fine roots; neutral; abrupt smooth boundary.
C1—9 to 23 inches; pale brown (10YR 6/3) sand, very pale brown (10YR 8/3) dry; single grain; loose, nonsticky and nonplastic; common fine roots; neutral; clear smooth boundary.
C2—23 to 31 inches; 60 percent pale brown (10YR 6/3) loamy sand and 40 percent grayish brown (10YR 5/2) silt loam, very pale brown (10YR 8/3) and light gray (10YR 7/2) dry; massive; soft, very friable, nonsticky and nonplastic; neutral; clear smooth boundary.
C3—31 to 45 inches; 99 percent pale brown (10YR 6/3) and 1 percent very dark grayish brown (10YR 3/2) loamy sand and silt loam, very pale brown (10YR 8/3) and grayish brown (10YR 5/2) dry; single grain; loose, nonsticky and nonplastic; neutral; clear smooth boundary.
C4—45 to 71 inches; 60 percent very pale brown (10YR 7/3) and 40 percent light brownish gray (10YR 6/2) sandy loam, very pale brown (10YR 8/2) and light gray (10YR 7/2) dry; massive; soft, very friable, nonsticky and nonplastic; neutral; clear smooth boundary.
C5—71 to 80 inches; light brownish gray (10YR 6/2) sandy loam, very pale brown (10YR 8/2) dry; massive; soft, very friable, nonsticky and nonplastic; neutral.

Range in Characteristics

Particle-size control section (weighted average): 10 to 40 inches
Content of clay in the particle-size control section (weighted average): 0 to 10 percent
Content of sand in the particle-size control section (weighted average): 50 to 90 percent

A horizon:
Hue—10YR
Value—2 to 4 moist, 4 to 6 dry
Chroma—2 or 3
Texture—sand, loamy sand, loamy fine sand, fine sand, loamy very fine sand, or very fine sand
Content of clay—0 to 10 percent
Reaction—strongly acid to neutral

C horizon:
Hue—10YR
Value—4 to 7
Chroma—2 to 4
Texture—sand, loamy sand, fine sand, very fine sand, loamy sand, loamy very fine sand, loamy fine sand, or fine sandy loam
Content of clay—0 to 10 percent
Reaction—neutral to moderately alkaline

Summit Series

The Summit series consists of very deep, moderately well drained soils that formed in material weathered from residual shales or colluvial calcareous clays of Pennsylvanian age. These nearly level to strongly sloping soils are on slightly convex uplands and footslopes in the Cherokee Prairies Major Land Resource Area (MLRA 112). Slopes range from 0 to 12 percent. The mean annual precipitation is 41 inches, and the mean annual temperature is 61 degrees F.

Taxonomic classification: Fine, smectitic, thermic Oxyaquic Vertic Argiudolls

Typical Pedon

Summit silty clay loam, in an area of rangeland in Rogers County, Oklahoma; about 6 miles east of Tulsa; 1,900 feet south and 1,800 feet west of the northeast corner of sec. 26, T. 20 N., R. 14 E. (Colors are for moist soil unless otherwise indicated.)

A1—0 to 7 inches; black (10YR 2/1) silty clay loam; strong fine and medium granular structure; hard, friable; many fine roots; neutral; gradual smooth boundary.
A2—7 to 13 inches; black (10YR 2/1) silty clay loam; strong medium granular structure; very hard; firm; many fine roots; slightly acid; gradual smooth boundary.
BA—13 to 21 inches; black (10YR 2/1) silty clay loam; few fine distinct strong brown and yellowish brown mottles; moderate medium and fine subangular blocky structure; extremely hard, very firm; many fine roots; slightly acid; gradual smooth boundary.
Bt1—21 to 37 inches; very dark brown (10YR 2/2) silty clay; common fine distinct yellowish red redoximorphic concentrations; moderate medium blocky structure; extremely hard, very firm; few slickensides; clay films or pressure faces on faces of peds; many fine roots; few fine black concretions; slightly acid; gradual smooth boundary.
Bt2—37 to 51 inches; very dark brown (10YR 2/2) silty clay; common fine distinct yellowish red redoximorphic concentrations; moderate medium and coarse blocky

structure; extremely hard, very firm; few slickensides; clay films or pressure faces on faces of peds; common fine roots; few fine black concretions; neutral; gradual smooth boundary.

Bt3—51 to 65 inches; very dark grayish brown (2.5Y 3/2) silty clay; few fine distinct yellowish red redoximorphic concentrations; moderate medium and coarse blocky structure; extremely hard, very firm; few slickensides; clay films or pressure faces on faces of peds; common fine roots; few fine black concretions; neutral; gradual smooth boundary.

BC—65 to 89 inches; very dark grayish brown (2.5Y 3/2) silty clay; few fine distinct yellowish red redoximorphic concentrations; weak medium and coarse blocky structure; extremely hard, very firm; few slickensides; patchy clay films or pressure faces on faces of peds; few fine roots; few black concretions; few fragments of sandstone and shale from 2 to 75 mm in diameter; neutral; gradual smooth boundary.

C—89 to 116 inches; coarse redoximorphic features are yellowish red (5YR 4/6), dark gray (10YR 4/1), and yellowish brown (10YR 5/4) silty clay; massive; extremely hard, very firm; few black concretions; few fragments of shale from 2 to 75 mm in diameter; neutral.

Range in Characteristics

Thickness of the solum: 50 to more than 60 inches
Depth to bedrock: More than 60 inches
Other features: This soil has a COLE of 0.09 or more and it has deep, wide cracks generally during the summer months. Slickensides occur in the B horizons.

A horizon:
Hue—10YR or 2.5Y
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam or silty clay
Content of rock fragments 2 to 76 mm in diameter—0 to 10 percent, by volume
Structure—moderate or strong, fine, or moderately granular
Reaction—neutral to moderately acid

BA horizon:
Hue—10YR or 2.5Y
Value—2 or 3
Chroma—1 or 2
Redoximorphic features—brown redoximorphic concentrations
Texture—silty clay loam, silty clay, or clay
Content of rock fragments 2 to 76 mm in diameter—0 to 10 percent, by volume
Reaction—neutral to moderately acid
Structure—weak or moderate subangular blocky that parts to strong or medium granular structure

Bt1 horizon:
Hue—10YR or 2.5Y
Value—2 to 4
Chroma—1 to 4
Redoximorphic features—red or brown redoximorphic concentrations or gray redoximorphic depletions
Texture—silty clay or clay
Content of rock fragments 2 to 76 mm in diameter—0 to 15 percent, by volume
Reaction—neutral to moderately acid

Bt horizon (lower part) and BC horizon:
Hue—7.5YR to 2.5Y
Value—2 to 4
Chroma—1 to 4
Redoximorphic features—red or brown redoximorphic concentrations or gray redoximorphic depletions
Texture—silty clay or clay
Content of rock fragments 2 to 76 mm in diameter—0 to 15 percent, by volume
Reaction—slightly acid to moderately alkaline

C horizon:
Redoximorphic features—coarsely mixed red, gray, and brown redoximorphic concentrations
Texture—silty clay, clay, or silty clay loam
Content of rock fragments 2 to 76 mm in diameter—0 to 15 percent, by volume; grayish soft bedrock in some pedons
Reaction—neutral to moderately alkaline

Thurman Series

The Thurman series consists of very deep, somewhat excessively drained soils that formed mainly in sandy eolian material. They are on uplands and stream terraces. Slopes range from 0 to 40 percent. The mean annual temperature is about 49 degrees F, and the mean annual precipitation is about 25 inches at the type location.

Taxonomic classification: Sandy, mixed, mesic Udorthentic Haplustolls

Typical Pedon

Thurman loamy fine sand, on a slope of 4 percent, in a cultivated field in Pierce County, Nebraska; about 1 mile east and 3 miles south of Breslau; 1,320 feet east and 50 feet south of the northwest corner of sec. 21, T. 27 N., R. 3 W. (Colors are for dry soil unless otherwise indicated.)

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; soft, very friable; slightly acid; abrupt smooth boundary.
A—6 to 10 inches; dark grayish brown (10YR 4/2) loamy fine sand, very dark gray (10YR 3/1) moist; weak coarse blocky structure; soft, very friable; slightly acid; clear smooth boundary.
AC—10 to 14 inches; brown (10YR 5/3) loamy fine sand, dark brown (10YR 4/3) moist; weak coarse prismatic structure; soft, very friable; slightly acid; clear smooth boundary.
Cl—14 to 32 inches; light yellowish brown (10YR 6/4) loamy fine sand, brown (10YR 5/3) moist; single grain; loose; neutral; gradual smooth boundary.
C2—32 to 80 inches; light yellowish brown (10YR 6/4) fine sand, yellowish brown (10YR 5/4) moist; single grain; loose; neutral.

Range in Characteristics

Soil moisture regime: Ustic; the soil moisture control section is moist in some part from October through April, intermittently moist from May through June, and driest from July through September.
Depth to secondary carbonates: Free calcium carbonate is typically absent within a depth of 5 feet.
Thickness of the mollic epipedon: 10 to 20 inches

Depth to rock fragments: A few small or medium pebbles are scattered in some places throughout the profile.

A horizon:
Hue—10YR
Value—3 to 5 dry, 2 or 3 moist
Chroma—1 or 2
Texture—loamy fine sand, fine sand, sand, loamy sand, sandy loam, or fine sandy loam
Reaction—slightly acid to neutral

AC horizon:
Hue—10YR
Value—3 to 5 dry, 2 or 3 moist
Chroma—2 or 3
Texture—loamy fine sand, fine sand, sand, loamy sand, or sandy loam
Reaction—slightly acid to neutral

C horizon:
Hue—10YR or 2.5Y
Value—5 to 7 dry, 4 or 5 moist
Chroma—2 to 4
Texture—loamy fine sand, fine sand, fine sand, loamy sand, sand, or very fine sand
Reaction—moderately acid to neutral; where the soils are underlain by calcareous bedrock or other calcareous materials, the overlying horizon is slightly alkaline or moderately alkaline

Verdigris Series

The Verdigris series consists of very deep, well drained soils that formed in silty alluvium. These soils are on flood plains in the Cherokee Prairies major land resource area (MLRA 112). Slopes range from 0 to 3 percent. The mean annual precipitation is 35 to 47 inches, and the mean annual air temperature is 57 to 65 degrees F.

Taxonomic classification: Fine-silty, mixed, superactive, thermic Cumulic Hapludolls

Typical Pedon

Verdigris silt loam, in a cultivated field in Montgomery County, Kansas; about 1 mile west of Elk City on the flood plain west of the Verdigris River; 2,200 feet south and 2,300 feet east of the northwest corner of sec. 6, T. 32 S., R.14 E. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 7 inches; very dark brown (10YR2/2) silt loam, very dark grayish brown (10YR3/2) dry; weak medium granular structure; slightly hard, friable; moderately acid; abrupt smooth boundary.
A—7 to 28 inches; very dark brown (10YR2/2) silt loam, very dark grayish brown (10YR3/2) dry; moderate medium granular structure; slightly hard, friable; scattered wormcasts; slightly acid; gradual smooth boundary.
AC—28 to 46 inches; dark brown (10YR3/3) silt loam, brown (10YR4/3) dry; weak medium granular structure; slightly hard, friable; scattered wormcasts; slightly acid; gradual smooth boundary.
C—46 to 60 inches; brown (10YR4/3) silt loam, brown (10YR5/3) dry; few fine faint yellowish brown (10YR4/4) redoximorphic concentration masses; massive; slightly hard, friable; few fine pores; slightly acid.

Range in Characteristics

Soil moisture regime: Udic
Depth to redoximorphic concentrations (if they occur): 20 to more than 60 inches
Content of clay in the particle-size control section (weighted average): 15 to 33 percent
Content of sand in the particle-size control section (weighted average): 1 to 7 percent
Other features: Dark color Ab horizons are below the C horizon in some pedons.

Ap and A horizons:
Hue—7.5YR to 2.5Y
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 to 3
Texture—silt loam or silty clay loam
Content of clay—15 to 33 percent
Base saturation—75 to 90 percent
Reaction—moderately acid to neutral

AC horizon:
Hue—7.5YR to 2.5Y
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 to 3
Texture—silt loam or silty clay loam
Reaction—moderately acid to neutral

C horizon:
Hue—7.5YR to 2.5Y
Value—3 to 6 moist, 4 to 7 dry
Chroma—2 to 4
Texture—silt loam or silty clay loam; sandy loam, loam, clay loam, or silty clay below a depth of 40 inches
Reaction—moderately acid to neutral

Bt horizon (if it occurs):
Hue—10YR
Value—3; ranges to 4 (lower part)
Chroma—2 or 3; ranges to 1 (lower part))
Texture—silt loam, silty clay loam, or loam
Content of clay—17 to 30 percent
Base saturation—60 to 90 percent
Reaction—strongly acid to slightly acid

Vinland Series

The Vinland series consists of shallow over shale, somewhat excessively drained soils that formed in residuum derived from interbedded sandy and silty shales. These soils are on uplands. Slopes range from 4 to 30 percent.

Taxonomic classification: Loamy, mixed, superactive, mesic, shallow Typic Hapludolls

Typical Pedon

Vinland silty clay loam, in an area of native grassland about 25 miles southwest of Topeka, in Shawnee County, Kansas; 225 feet west and 2,400 feet north of the southeast corner of sec. 32, T. 13 S., R. 14 E. (Colors are for moist soil unless otherwise indicated.)

A—0 to 6 inches; very dark brown (10YR 2/2) silty clay loam, very dark grayish brown (10YR 3/2) dry; moderate medium and fine granular structure; hard, friable; slightly acid; gradual smooth boundary.
Bw—6 to 11 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure; hard, friable; few small fragments of shale; slightly acid; gradual smooth boundary.
C—11 to 16 inches; dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4) silty clay loam, pale brown (10YR 6/3) and yellowish brown (10YR 5/4) dry; massive; hard, friable; many small shale fragments; slightly acid; clear wavy boundary.
Cr—16 to 24 inches; weathered, interbedded sandy and silty shale.

Range in Characteristics

Thickness of the solum: 10 to 20 inches
Depth to bedrock: 10 to 20 inches
Thickness of the mollic epipedon: 7 to 15 inches
Reaction: Moderately acid to mildly alkaline
Texture: Fine sandy loam, loam, silt loam, or silty clay loam
Volume of rock fragments 0 to 3 inches in diameter in the particle-size control section: 0 to 15 percent

A horizon:
Hue—7.5YR or 10YR
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 or 2

Bw horizon:
Hue—7.5YR to 5Y
Value—2 to 5 moist, 3 to 6 dry
Chroma—2 to 4

C horizon:
Hue—7.5YR to 5Y
Value—4 to 7 moist, 5 to 8 dry
Chroma—2 to 4
Texture—fine sandy loam, loam, silt loam, or silty clay loam; includes the shaly counterparts of these textures

Wabash Series

The Wabash series consists of very deep, poorly and very poorly drained soils that formed in alluvium. These soils are on flood plains. Slopes range from 0 to 2 percent. The mean annual temperature is 53 degrees F, and the mean annual precipitation is 36 inches.

Taxonomic classification: Fine, smectitic, mesic Cumulic Vertic Endoaquolls

Typical Pedon

Wabash silty clay, on a slope of 0.5 percent, in a cultivated field about 4 miles south of Utica on the east side of Missouri State Highway “C”, in Livingston County, Missouri; 2,620 feet south and 20 feet east of the northwest corner of sec. 7, T. 56 N., R. 24 W. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 6 inches; very dark brown (10YR 2/2) silty clay, dark grayish brown (10YR 4/2) dry; weak and moderate fine granular structure; firm; few fine faint dark gray (10YR 4/1) iron depletions; few fine black concretions (oxides); moderately acid; abrupt smooth boundary.

A1—6 to 9 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; strong fine and medium subangular blocky structure; firm; few fine faint dark gray (10YR 4/1) iron depletions; few fine black concretions (oxides); moderately acid; clear smooth boundary.

A2—9 to 19 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; very firm; few pressure faces; few fine distinct dark yellowish brown (10YR 4/4) iron masses; many fine concretions (oxides); slightly acid; gradual smooth boundary.

Bg1—19 to 38 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; some large spots and streaks of dark gray (5Y 4/1); moderate fine subangular blocky structure; very firm; common pressure faces; common coarse distinct dark yellowish brown (10YR 4/4) iron masses; many fine concretions (oxides); some exteriors of peds are very dark gray (N 3/0); slightly acid; diffuse smooth boundary.

Bg2—38 to 60 inches; dark gray (N 4/0) silty clay; large spots and streaks of gray (5Y 4/1); weak fine subangular blocky structure; common pressure faces; extremely firm; many fine concretions (oxides); slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 36 to 44 inches
Depth to carbonates: More than 40 inches
Depth to redoximorphic concentrations: 0 to 9 inches
Content of clay in the particle-size control section (weighted average): 40 to 60 percent
Content of sand in the particle-size control section (weighted average): Less than 15 percent
Content of rock fragments: None

A horizon:
Hue—10YR to 5Y or N
Value—2 or 3
Chroma—0 to 2
Texture—silty clay or clay
Content of clay—40 to 60 percent
Content of sand—less than 5 percent
Reaction—strongly acid to neutral

A horizon (overwash phase):
Hue—10YR to 5Y
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam
Content of clay—20 to 40 percent
Content of sand—5 to 20 percent
Reaction—strongly acid to neutral
Thickness of the horizon—6 to 20 inches

Bg horizon:
Hue—10YR to 5Y or N
Value—2 to 5
Chroma—0 to 2
Texture—silty clay or clay
Content of clay—40 to 60 percent
Content of sand—less than 15 percent
Reaction—strongly acid to neutral

Cg horizon (if it occurs):
Hue—10YR to 5Y or N
Value—2 to 5
Chroma—0 to 2
Texture—silty clay or clay
Content of clay—40 to 60 percent
Content of sand—less than 15 percent
Reaction—strongly acid to slightly alkaline

Wagstaff Series

The Wagstaff series consists of moderately deep, well drained soils that formed in limestone residuum on uplands. Slopes range from 1 to 8 percent. The mean annual temperature is 56 degrees F, and the mean annual precipitation is 35 inches.

Taxonomic classification: Fine, smectitic, thermic Vertic Argiudolls

Typical Pedon

Wagstaff silt loam, 1 to 4 percent slopes, in a pasture in Miami County, Kansas; about 6 miles west and 4 miles north of Hillsdale; 280 feet north and 920 feet west of the southeast corner of sec. 27, T. 15 S., R. 22 E. (Colors are for moist soil unless otherwise indicated.)

Ap—0 to 7 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to weak fine granular; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; neutral; clear smooth boundary.
A1—7 to 14 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak very fine and fine subangular structure; slightly hard, friable, sticky and plastic; many fine roots; neutral; clear smooth boundary.
BA—14 to 18 inches; brown (7.5YR 4/2) silty clay loam, pinkish gray (7.5YR 6/2) dry; moderate very fine and fine subangular blocky structure; hard, firm, sticky and plastic; many fine roots; slightly acid; clear smooth boundary.
Bt1—18 to 24 inches; reddish brown (5YR 4/3) silty clay loam, light reddish brown (5YR 6/3) dry; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; common fine roots; few fine manganese concretions; common distinct clay films; slightly acid; clear smooth boundary.
Bt2—24 to 33 inches; reddish brown (5YR 4/4) silty clay, light reddish brown (5YR 6/4) dry; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common fine roots; few fine manganese concretions; common distinct clay films; slightly acid.
R—33 inches; limestone bedrock.

Range in Characteristics

Thickness of the solum: 20 to 40 inches
Depth to lithic contact with hard limestone bedrock: 20 to 40 inches
Thickness of the mollic epipedon: 8 to 20 inches

A horizon:
Value—2 or 3 moist, 4 or 5 dry
Chroma—2 or 3
Texture—silt loam or silty clay loam

Bt horizon:
Hue—7.5YR or 5YR
Value—3 to 5 moist, 5 to 7 dry

Chroma—2 to 4
Texture—silty clay loam or silty clay
Content of clay—35 to 50 percent

Woodson Series

The Woodson series consists of deep, somewhat poorly drained soils that formed in silty and clayey sediments. These soils are on uplands.

Taxonomic classification: Fine, smectitic, thermic Abruptic Argiaquolls

Typical Pedon

Woodson silt loam, on a nearly level area in native grass in Allen County, Kansas; 4 miles south of LaHarpe, Kansas; 100 feet south and 1,420 feet east of the northwest corner of sec. 23, T. 25 S., R. 19 E. (Colors are for moist soil unless otherwise indicated.)

A—0 to 8 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine granular structure; slightly hard, friable; many roots; moderately acid; abrupt smooth boundary.
Bt1—8 to 19 inches; very dark gray (10YR 3/l) silty clay, dark gray (10YR 4/1) dry; few fine faint dark brown (10YR 3/3) mottles; moderate fine blocky structure; extremely hard, very firm; common roots; moderately acid; gradual smooth boundary.
Bt2—19 to 31 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; many medium distinct strong brown (7.5YR 5/6) and a few medium distinct olive brown (2.5Y 4/4) mottles; moderate fine and medium blocky structure; extremely hard, very firm; fine and medium concretions; moderately acid; gradual smooth boundary.
BC—31 to 38 inches; gray (10YR 5/1) silty clay, gray (10YR 6/1) dry; few medium distinct dark reddish brown (5YR 3/4) mottles; weak medium blocky structure; extremely hard, very firm; few roots; few fine black concretions; common fine gypsum particles; moderately acid; diffuse wavy boundary.
C—38 to 60 inches; gray (10YR 5/1) silty clay, gray (10YR 6/1) dry; many fine distinct olive (5Y 4/4) mottles; moderate fine and very fine blocky structure; extremely hard, very firm; very few roots; common fine black concretions; common black stains; few fine gypsum particles; moderately acid.

Range in Characteristics

Thickness of the solum: 30 to 60 inches
Thickness of the mollic epipedon: 7 to 14 inches
Content of clay in the particle-size control section (weighted average): 40 to 60 percent
Content of sand in the particle-size control section (weighted average): 1 to 10 percent

A horizon:
Hue—10YR
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 or less
Texture—silt loam or silty clay loam
Reaction—moderately acid or slightly acid

Bt horizon (upper part):
Hue—10YR or 2.5Y
Value—2 or 3 moist, 3 to 5 dry

Chroma—1.5 or less
Texture—silty clay or clay
Reaction—moderately acid to neutral
Special features—faces of peds are coated with grayish silt grains in the upper part of some pedons

Bt horizon (lower part):
Hue—10YR to 5Y
Value—3 to 5 moist, 4 to 6 dry
Chroma—1.5 or less
Redoximorphic features—range from few to many, and are distinct in contrast
Texture—silty clay or clay
Reaction—moderately acid to neutral
Special features—faces of peds are coated with grayish silt grains in the upper part of some pedons

C horizon:
Hue—10YR to 5Y
Value—4 to 6 moist, 5 to 7 dry
Chroma—1 to 3
Redoximorphic features—range from few to many, and are distinct in contrast
Texture—silty clay loam, silty clay, or clay
Reaction—moderately acid to mildly alkaline

Wynona Series

The Wynona series consists of very deep, somewhat poorly drained soils that formed in silty alluvium of Pleistocene age. These soils are on nearly level to slightly concave flood plains which drain the Cherokee Prairies (MLRA 112). Slopes range from 0 to 3 percent. The mean annual air temperature is 59 degrees F, and the mean annual precipitation is 42 inches.

Taxonomic classification: Fine-silty, mixed, active, thermic Cumulic Epiaquolls

Typical Pedon

Wynona silty clay loam, in an area of tame pasture in Osage County, Oklahoma; about 4 miles south and l mile west of Skiatook; about 1,900 feet south and 70 feet west of the northeast corner of sec. 9, T. 21 N., R. 12 E. (Colors are for moist soil unless otherwise indicated.)

A1—0 to 8 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; slightly hard, friable; slightly acid; gradual smooth boundary.

A2—8 to 23 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; with few fine distinct yellowish red redoximorphic concentrations; weak medium subangular blocky structure parting to moderate medium granular structure; hard, firm; moderately acid; gradual smooth boundary.

A3—23 to 35 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; with common fine distinct strong brown redoximorphic concentrations; weak medium subangular blocky structure; hard, firm; moderately acid; gradual smooth boundary.

Bg1—35 to 47 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; with common medium distinct strong brown (7.5YR 5/6) redoximorphic concentrations; weak medium blocky structure; hard, firm; common fine black concretions; moderately acid; gradual smooth boundary.

Bg2—47 to 63 inches; dark gray (10YR 4/1) silty clay, gray (10YR 5/1) dry; with

common coarse distinct strong brown (7.5YR 5/6) and few fine distinct light brownish gray redoximorphic concentrations and depletions; weak medium blocky structure; hard, firm; few fine black concretions; moderately acid.

Range in Characteristics

Thickness of the solum: 40 inches to more than 60 inches
Depth to bedrock: More than 72 inches
Thickness of the mollic epipedon: 24 inches to more than 40 inches
Other features: Some pedons have buried horizons below a depth of 40 inches
Content of clay in the particle-size control section (weighted average): 27 to 35 percent

A horizon (upper part):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam
Reaction—moderately acid or slightly acid

A horizon (lower part):
Hue—10YR
Value—2 to 4
Chroma—1 or 2
Redoximorphic features—shades of red, brown, and gray
Texture—silt loam or silty clay loam
Reaction—strongly acid or moderately acid

Bg horizon:
Hue—10YR
Value—3 or 4
Chroma—1 or 2
Redoximorphic features—shades red, brown, or gray
Texture—silty clay loam or silty clay
Reaction—strongly acid to slightly acid

Formation of the Soils

This section tells how the factors of soil formation have affected the development of soils in Johnson County.

Factors of Soil Formation

Soil is produced by soil-forming processes acting on deposited or accumulated geologic material. The characteristics of the soil at any given point are determined by the physical and mineralogical composition of the parent material; the climate under which the soil material has accumulated and existed since accumulation; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time the forces of soil formation have acted on the soil material.

Climate and plant and animal life, mainly plants, are the active factors of soil formation. These factors act on the parent material and slowly change it to a natural body that has genetically related horizons. The effects of climate and animal and plant life are conditioned by relief. The parent material also influences the kind of soil profile that is formed and, in extreme cases, the parent material entirely determines the kind of soil that is formed.

Finally, time is needed to change the parent material into a soil profile. A long time is usually required for a soil profile to form distinct horizons. The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effect of any one factor unless conditions are specified for the other four.

Human activities also affect the factors of soil formation. They have an immediate effect on the rate and the direction of the changes caused by the soil-forming processes. Additions of fertilizer and irrigation water change the soil. Cultivation can result in soil loss unless erosion is controlled. Conservation tillage practices and terraces have beneficial effects on the soil.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. It largely determines the mineralogical and chemical composition of the soil. Through weathering, rock gives rise to parent material, and this is the first step in soil development. Rocks are weathered by such natural forces as freezing and thawing, abrasion and erosion by wind and water, and biological and chemical action. In the northwestern part of Johnson County, glacial action has increased the weathering process by scouring and grinding the rocks.

The nature of the parent material influences the kind of soil that develops and the rate of development. Also, many chemical and physical properties of the soil are inherited from the parent material. Many different parent materials are present in Johnson County, and each parent material has influenced, to some degree, the kinds of soil that developed.

The parent materials are residuum from limestone, sandstone, and shale; loess deposits; glacial sediment; and alluvial sediment. In many areas, the rocks are covered with loess and, to a lesser extent, glacial till.

Climate

Climate has influenced soil formation in Johnson County. Temperature and precipitation have played an important role in the physical and chemical weathering of the parent material. Organisms acting upon the parent material and in the soil contribute organic matter and nutrients to the soil. Their activity is governed by climate. Chemical, physical, and biological processes in the soil are quite active in the humid, warm climate of Johnson County.

Plant and Animal Life

Vegetation is very important in the development of soils. Plants, especially grasses, provide the soil with much organic matter. Plants also draw nutrients from the soil and parent material. After dying, the plant material is attacked by micro-organisms. Through this process, organic matter is formed and nutrients are released, thus the surface layer is enriched. Under grassland, the soil develops a dark-colored surface layer that is rich in organic matter and nutrients. Plants also protect the surface layer from erosion.

Worms and other micro-organisms also influence soil formation. Worms pass large quantities of organic matter and soil through their digestive systems, thus altering them chemically and physically. Worms also incorporate organic matter and provide for drainage and aeration along their burrows.

Most soils in Johnson County are believed to have been formed under the cover of grasses. The surface layers are rich in content of organic matter and nutrients. Some soils along drainageways on uplands have developed under a cover of deciduous trees. These soils have a grayish surface layer and have less content of organic matter than grassland soils.

Relief

Relief affects soil formation mainly through its influence on runoff, erosion, aeration, and drainage. The rate of runoff is more rapid on steep and very steep soils than on the less sloping soils. Consequently, plant growth generally is less vigorous on the steeper soils, less water penetrates the surface, soil horizons are thinner and less distinct, and lime (calcium carbonate) is not so deeply leached. Also, the hazard of erosion is more severe on the steeper soils if all other factors are equal.

Time

The length of time required for a soil to develop depends upon the parent material, climate, vegetation and other living organisms, and relief.

Soil development on bedrock, such as sandstone and limestone, will require more time than soils being developed from loess. The Sibleyville soils, which formed in residuum from sandstone, are less developed than the Grundy soils, which formed in loess, even though the loess is the younger parent material.

Less time is required for a soil to develop in humid, warm climates. Assuming loess is the parent material, the soils in the western part of Kansas are less developed than those in the eastern part of Kansas, mainly because of climate (less rainfall) and the indirect influence of climate on vegetation.

More time is required for soil development on sloping land. Runoff is greater, thus reducing the amount of water percolating through the soil. The Sharpsburg soils are on narrow, sloping ridges and have a less clayey subsoil than the Grundy soils, which are on the more broad, gentle landscapes.

Among some of the oldest soils in the county are the Grundy, Pawnee, and Martin soils, which formed in loess, till, and shale residuum, respectively. They have well developed subsoils or B horizons. Eudora and Kennebec soils are among the younger soils and formed in recent alluvium. They do not have distinct horizons.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope. A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and

clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/ or proportion of species or in total production.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep

to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim (in tables). Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a

very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface

of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

K_{sat}. Saturated hydraulic conductivity. (See Permeability.)

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace. An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan. A compact, dense layer in a soil that impedes the movement of water and the

growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as “saturated hydraulic conductivity,” which is defined in the “Soil Survey Manual.” In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as “permeability.” Terms describing permeability, measured in inches per hour, are as follows:

Impermeable	less than 0.0015 inch
Very slow	0.0015 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Red beds. Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth’s surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Level	0 to 1 percent
Nearly level	1 to 3 percent
Very gently sloping	2 to 5 percent
Gently sloping	3 to 7 percent
Moderately sloping	6 to 9 percent
Strongly sloping	9 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 60_ percent
Very steep	45 percent and higher

Classes for complex slopes are as follows:

Level	0 to 2 percent
Nearly level	0 to 3 percent
Gently undulating	3 to 5 percent
Undulating	3 to 6 percent
Gently rolling	6 to 9 percent
Rolling	9 to 15 percent
Hilly	15 to 25 percent
Steep	25 to 45 percent
Very steep	45 percent and higher

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce

a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Too acid (in tables). The soil is so acid that growth of plants is restricted.

Too clayey (in tables). The soil is slippery and sticky when wet and slow to dry.

Too sandy (in tables). The soil is soft and loose, droughty, and low in fertility or is too fine to use as gravel.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1971-2000 at Olathe, Kansas)

Month	Temperature						Precipitation				
	Avg. daily max.	Avg. daily min.	Avg.	2 yrs in 10 will have: Max. temp. >than	2 yrs in 10 will have: Min. temp. <than	Avg. # of grow deg. days*	Avg.	2 yrs in 10 will have: Less than	2 yrs in 10 will have: More than	Avg. # of days w/1 or more	Avg. total snow-fall
	°F	°F	°F	°F	°F	Units	In	In	In	In	In
January	38.1	19.9	29.0	65	-9	3	1.26	0.40	2.17	3	5.7
February	44.5	25.2	34.9	73	-6	14	1.27	0.50	2.02	3	4.3
March	55.7	34.7	45.2	81	8	76	2.74	1.48	3.67	5	2.5
April	66.2	44.7	55.4	86	23	212	3.78	1.91	5.57	6	0.4
May	75.0	54.9	64.9	90	37	464	5.41	2.88	7.76	8	0.0
June	83.7	63.8	73.7	96	48	712	5.21	2.90	7.25	7	0.0
July	88.8	68.5	78.6	101	55	885	4.03	1.37	6.36	5	0.0
August	87.3	66.5	76.9	102	52	834	3.56	1.46	5.45	5	0.0
September	79.6	58.3	68.9	96	37	569	4.69	1.77	7.01	5	0.0
October	68.8	47.3	58.1	88	26	279	3.48	1.40	5.54	5	0.2
November	53.3	34.8	44.0	76	12	56	2.97	1.42	4.51	5	1.3
December	41.6	24.2	32.9	68	-5	7	1.76	0.52	3.03	3	3.1
Yearly:											
Average	65.2	45.2	55.2	---	---	---	----	----	----	---	---
Extreme	108	-22	---	103	-13	---	----	----	----	---	---
Total	---	---	---	---	---	4,112	40.15	32.20	47.74	60	17.5

*A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1971-2000 at Olathe, Kansas)

Probability	Temperature		
	24°F or lower	28°F or lower	32°F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 6	Apr. 13	Apr. 20
2 year in 10 later than--	Mar. 31	Apr. 9	Apr. 16
5 year in 10 later than--	Mar. 18	Apr. 2	Apr. 8
First freezing temperature in fall:			
1 yr in 10 earlier than--	Oct. 27	Oct. 15	Oct. 15
2 yr in 10 earlier than--	Nov. 2	Oct. 22	Oct. 19
5 yr in 10 earlier than--	Nov. 14	Nov. 4	Oct. 27

Table 3.--Growing Season

(Recorded in the period 1971-2000 at Olathe, Kansas)

Probability	Daily minimum temperature during growing season		
	Higher than 24°F	Higher than 28°F	Higher than 32°F
9 years in 10	211	193	184
8 years in 10	220	200	190
5 years in 10	239	215	201
2 years in 10	258	230	212
1 year in 10	268	238	218

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
4015	Chase silt loam, occasionally flooded	3,507	1.1
4752	Sogn-Vinland complex, 3 to 25 percent slopes	14,122	4.6
7031	Eudora silt loam, occasionally flooded	86	*
7035	Eudora-Bismarckgrove fine sandy loams, overwash, occasionally flooded	1,359	0.4
7036	Eudora-Bismarckgrove silt loams, occasionally flooded	1,254	0.4
7050	Kennebec silt loam, occasionally flooded	9,935	3.2
7051	Kennebec silt loam, frequently flooded	6,576	2.1
7055	Kimo silty clay loam, occasionally flooded	114	*
7089	Stonehouse-Eudora fine sandy loams, overwash, occasionally flooded	115	*
7090	Wabash silty clay loam, occasionally flooded	511	0.2
7105	Belvue silt loam, escarpment, 2 to 12 percent slopes	23	*
7106	Eudora-Bismarckgrove silt loams, rarely flooded	1,527	0.5
7123	Eudora silt loam, rarely flooded	515	0.2
7155	Kimo silty clay loam, rarely flooded	123	*
7170	Reading silt loam, rarely flooded	2,026	0.7
7251	Grundy silt loam, 1 to 3 percent slopes	15,941	5.2
7261	Gymer silt loam, 3 to 7 percent slopes	19	*
7285	Ladoga silt loam, 3 to 8 percent slopes	6,522	2.1
7286	Ladoga silt loam, 8 to 15 percent slopes	1,316	0.4
7302	Martin silty clay loam, 3 to 7 percent slopes	10,024	3.3
7330	Martin-Vinland silty clay loams, 5 to 10 percent slopes	1,448	0.5
7433	Morrill loam, 3 to 7 percent slopes	4,764	1.6
7460	Oska silty clay loam, 3 to 6 percent slopes	1,692	0.6
7462	Oska-Martin complex, 4 to 8 percent slopes	46,069	15.0
7502	Pawnee clay loam, 3 to 7 percent slopes	5,347	1.7
7525	Chillicothe silt loam, 2 to 5 percent slopes	54,136	17.6
7535	Sharpsburg silt loam, 4 to 8 percent slopes	5,042	1.6
7545	Sharpsburg-Urban land complex, 4 to 8 percent slopes	22,136	7.2
7603	Sibleyville loam, 3 to 7 percent slopes	4,608	1.5
7607	Sibleyville-Vinland loams, 3 to 7 percent slopes	1,576	0.5
7658	Vinland-Rock outcrop complex, 15 to 45 percent slopes	9,453	3.1
7805	Arisburg silt loam, 1 to 3 percent slopes	990	0.3
8101	Hepler silt loam, occasionally flooded	37	*
8301	Verdigris silt loam, frequently flooded	3,441	1.1
8302	Verdigris silt loam, occasionally flooded	174	*
8390	Wynona silt loam, occasionally flooded	42	*
8501	Mason silt loam, rarely flooded	578	0.2
8640	Bucyrus silt loam, 1 to 3 percent slopes	5,298	1.7
8641	Bucyrus silty clay loam, 3 to 8 percent slopes	556	0.2
8663	Clareson-Rock outcrop complex, 3 to 15 percent slopes	688	0.2
8789	Lebo channery silty clay loam, 15 to 30 percent slopes	344	0.1
8911	Summit silty clay loam, 1 to 3 percent slopes	887	0.3
8912	Summit silty clay loam, 3 to 7 percent slopes	5,301	1.7
8953	Wagstaff silt loam, 1 to 3 percent slopes	347	0.1
8955	Wagstaff silty clay loam, 3 to 7 percent slopes	2,801	0.9
8957	Wagstaff-Summit complex, 3 to 7 percent slopes	3,110	1.0
8962	Woodson silt loam, 1 to 3 percent slopes	45,909	15.0
9967	Landfill	150	*
9971	Arents, earthen dam	10	*
9982	Fluvents, frequently flooded	398	0.1
9983	Gravel pits and quarries	224	*
9984	Made land	78	*
9986	Miscellaneous water	48	*
9991	Orthents, shallow	517	0.2
9993	Pits	359	0.1
9999	Water	2,893	0.9
	Total	307,066	100.0

* Less than 0.1 percent.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Grain sorghum	Soybeans	Winter wheat
		Tons	Bu	Bu	Bu	Bu
4015:						
Chase-------------------	2w	---	---	80.8	---	35.0
4752:						
Sogn, Vinland-----------	7s, 6s	---	---	---	---	---
7031:						
Eudora------------------	2w	5.0	135.0	120.0	40.0	40.0
7035:						
Eudora, Bismarckgrove---	2w	5.0	135.0	120.0	40.0	40.0
7036:						
Eudora, Bismarckgrove---	2w	5.0	135.0	120.0	40.0	40.0
7050:						
Kennebec----------------	2w	---	110.0	---	50.0	---
7051:						
Kennebec----------------	6w	---	---	---	---	---
7055:						
Kimo--------------------	2w	4.5	100.0	95.0	35.0	40.0
7089:						
Stonehouse, Eudora------	4s, 2w	---	75.0	---	33.0	15.0
7090:						
Wabash------------------	3w	---	---	67.9	---	24.9
7105:						
Belvue------------------	2w	---	90.0	---	35.0	---
7106:						
Eudora, Bismarckgrove---	1, 2w	5.0	140.0	125.0	45.0	50.0
7123:						
Eudora------------------	1	5.0	140.0	125.0	45.0	50.0
7155:						
Kimo--------------------	2w	4.5	100.0	95.0	40.0	40.0
7170:						
Reading-----------------	1	---	---	90.8	33.8	42.1
7251:						
Grundy------------------	2e	---	---	64.5	24.0	29.9
7261:						
Gymer-------------------	3e	---	---	71.5	28.6	31.7
7285:						
Ladoga------------------	3e	---	---	69.0	25.7	32.0

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Grain sorghum	Soybeans	Winter wheat
		Tons	Bu	Bu	Bu	Bu
7286:						
Ladoga	4e	---	---	60.0	22.3	27.8
7302:						
Martin	3e	---	---	61.8	23.0	28.6
7330:						
Martin, Vinland	6e, 3e	---	---	---	---	---
7433:						
Morrill	3e	---	---	71.8	26.7	33.3
7460:						
Oska	3e	---	---	56.3	23.2	25.7
7462:						
Oska, Martin	4e	---	---	57.2	21.3	26.5
7502:						
Pawnee	3e	---	---	62.7	23.3	29.1
7525:						
Chillicothe	3e	---	---	76.3	28.4	35.4
7535:						
Sharpsburg	3e	---	---	69.0	25.7	32.0
7545:						
Sharpsburg	3e	---	---	69.0	25.7	32.0
Urban land	---	---	---	---	---	---
7603:						
Sibleyville	3e	3.2	60.0	65.0	22.0	30.0
7607:						
Sibleyville, Vinland	4e, 6e	---	---	54.5	---	28.2
7658:						
Vinland, Rock outcrop	6e, 8	---	---	---	---	---
7805:						
Arisburg	2e	3.5	125.0	113.0	54.0	60.0
8101:						
Hepler	2w	4.0	95.0	95.0	34.0	38.0
8301:						
Verdigris	5w	---	---	---	---	---
8302:						
Verdigris	2w	5.0	80.0	75.0	35.0	42.0
8390:						
Wynona	3w	5.0	---	70.0	35.0	35.0
8501:						
Mason	1	4.5	75.0	75.0	35.0	---
8640:						
Bucyrus	2e	4.0	75.0	80.0	35.0	45.0

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Grain sorghum	Soybeans	Winter wheat
		Tons	Bu	Bu	Bu	Bu
8641:						
Bucyrus-----------------	3e	3.5	70.0	75.0	30.0	40.0
8663:						
Clareson, Rock outcrop--	6e, 8s	---	---	---	---	---
8789:						
Lebo--------------------	6e	---	---	---	---	---
8911:						
Summit------------------	2e	4.0	60.0	65.0	35.0	40.0
8912:						
Summit------------------	3e	---	---	---	---	30.0
8953:						
Wagstaff----------------	3e	4.5	---	70.0	40.0	45.0
8955:						
Wagstaff----------------	3e	4.0	---	65.0	35.0	40.0
8957:						
Wagstaff, Summit--------	3e	4.0	---	65.0	35.0	40.0
8962:						
Woodson-----------------	3e	3.3	65.0	75.0	28.0	35.0
9967.						
Arents, landfill						
9971:						
Arents, earthen dam-----	8	---	---	---	---	---
9982:						
Fluvents----------------	6w	---	100.0	---	35.0	---
9983.						
Pits, quarries						
9984.						
Made land						
9986.						
Miscellaneous water						
9991.						
Orthents						
9993.						
Pits						
9999.						
Water						

Table 6.--Prime Farmland

(If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name.)

Map	Soil name
4015	Chase silt loam, occasionally flooded
7090	Wabash silty clay loam, occasionally flooded (where drained)
7106	Eudora-Bismarckgrove silt loams, rarely flooded
7123	Eudora silt loam, rarely flooded
7170	Reading silt loam, rarely flooded
7251	Grundy silt loam, 1 to 3 percent slopes
7261	Gymer silt loam, 3 to 7 percent slopes
7285	Ladoga silt loam, 3 to 8 percent slopes
7302	Martin silty clay loam, 3 to 7 percent slopes
7433	Morrill loam, 3 to 7 percent slopes
7502	Pawnee clay loam, 3 to 7 percent slopes
7525	Chillicothe silt loam, 2 to 5 percent slopes
7805	Arisburg silt loam, 1 to 3 percent slopes
8101	Hepler silt loam, occasionally flooded (where drained)
8302	Verdigris silt loam, occasionally flooded
8390	Wynona silt loam, occasionally flooded
8501	Mason silt loam, rarely flooded
8640	Bucyrus silt loam, 1 to 3 percent slopes
8911	Summit silty clay loam, 1 to 3 percent slopes
8962	Woodson silt loam, 1 to 3 percent slopes

Table 7.--Rangeland Productivity

(Only the soils that support rangeland vegetation suitable for grazing are rated.)

Map symbol and soil name	Ecological site	Total dry-weight production		
		Favorable year	Normal year	Unfavorable year
		Lb/acre	Lb/acre	Lb/acre
4015:				
Chase	Loamy Lowland (pe35-42)	10,000	8,500	6,000
4752:				
Sogn	Shallow Limy (pe30-37)	3,500	2,500	1,500
Vinland	Loamy Upland (pe30-37)	5,500	4,500	3,500
7031:				
Eudora	Loamy Lowland (pe30-37)	10,000	8,000	6,000
7035:				
Eudora	Loamy Lowland (pe30-37)	10,000	8,000	6,000
Bismarckgrove	Loamy Lowland (pe30-37)	10,000	8,000	6,000
7036:				
Eudora	Loamy Lowland (pe30-37)	10,000	8,000	6,000
Bismarckgrove	Loamy Lowland (pe30-37)	10,000	8,000	6,000
7050:				
Kennebec	Loamy Lowland (pe30-37)	10,000	8,000	6,000
7051:				
Kennebec	Loamy Lowland (pe30-37)	10,000	8,000	6,000
7055:				
Kimo	Loamy Lowland (pe30-37)	9,000	7,000	5,000
7089:				
Stonehouse	Sandy Lowland (pe30-37)	3,800	3,500	3,000
Eudora	Loamy Lowland (pe30-37)	10,000	8,000	6,000
7090:				
Wabash	---	10,000	9,000	7,000
7105:				
Belvue	Loamy Lowland (pe30-37)	5,300	4,900	4,500
7106:				
Eudora	Loamy Lowland (pe30-37)	10,000	8,000	6,000
Bismarckgrove	Loamy Lowland (pe30-37)	10,000	8,000	6,000
7123:				
Eudora	Loamy Lowland (pe30-37)	10,000	8,000	6,000
7155:				
Kimo	Loamy Lowland (pe30-37)	9,000	7,000	5,000
7170:				
Reading	Loamy Lowland (pe35-42)	10,000	8,000	6,000
7251:				
Grundy	Clay Upland (pe30-37)	---	---	---
7261:				
Gymer	Loamy Upland (pe30-37)	7,000	5,500	4,000

Table 7.--Rangeland Productivity--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year
		Lb/acre	Lb/acre	Lb/acre
7285:				
Ladoga	Loamy Upland (pe30-37)	4,800	4,400	4,000
7286:				
Ladoga	Loamy Upland (pe30-37)	4,800	4,400	4,000
7302:				
Martin	Loamy Upland (pe35-42)	7,000	5,500	4,000
7330:				
Martin	Loamy Upland (pe35-42)	7,000	5,500	4,000
Vinland	Loamy Upland (pe35-42)	5,500	4,500	3,500
7433:				
Morrill	Loamy Upland (pe30-37)	6,000	5,000	4,000
7460:				
Oska	Loamy Upland (pe35-42)	6,000	5,000	3,500
7462:				
Oska	Loamy Upland (pe35-42)	6,000	5,000	3,500
Martin	Loamy Upland (pe35-42)	7,000	5,500	4,000
7502:				
Pawnee	Clay Upland (pe30-37)	3,700	3,200	2,700
7525:				
Chillicothe	Loamy Upland (pe30-37)	6,000	5,000	3,500
7535:				
Sharpsburg	Loamy Upland (pe30-37)	4,800	4,400	4,000
7545:				
Sharpsburg	Loamy Upland (pe30-37)	4,800	4,400	4,000
Urban land.				
7603:				
Sibleyville	Loamy Upland (pe35-42)	6,000	5,000	3,500
7607:				
Sibleyville	Loamy Upland (pe35-42)	6,000	5,000	3,500
Vinland	Loamy Upland (pe35-42)	5,500	4,500	3,500
7658:				
Vinland	Loamy Upland (pe35-42)	5,500	4,500	3,500
Rock outcrop.				
7805:				
Arisburg	Loamy Upland (pe30-37)	10,000	7,000	5,000
8101:				
Hepler	Loamy Lowland (pe35-42)	10,000	8,500	6,000
8301:				
Verdigris	Loamy Lowland (pe35-42)	10,000	8,500	6,000
8302:				
Verdigris	Loamy Lowland (pe35-42)	10,000	8,500	6,000

Table 7.--Rangeland Productivity--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year
		Lb/acre	Lb/acre	Lb/acre
8390:				
Wynona	Loamy Lowland (pe35-42)	10,000	8,800	8,000
8501:				
Mason	Loamy Lowland (pe35-42)	11,500	9,400	8,000
8640:				
Bucyrus	Loamy Upland (pe35-42)	7,000	4,500	3,200
8641:				
Bucyrus	Loamy Upland (pe35-42)	7,000	4,500	3,200
8663:				
Clareson	Shallow Flats (pe35-42)	5,000	4,000	2,500
Rock outcrop.				
8789:				
Lebo	Loamy Upland (pe35-42)	6,000	5,000	4,000
8911:				
Summit	Clay Upland (pe35-42)	6,000	4,000	2,500
8912:				
Summit	Clay Upland (pe35-42)	7,000	5,500	4,500
8953:				
Wagstaff	Loamy Upland (pe35-42)	6,000	4,300	3,200
8955:				
Wagstaff	Loamy Upland (pe35-42)	6,000	4,300	3,200
8957:				
Wagstaff	Loamy Upland (pe35-42)	6,000	4,300	3,200
Summit	Clay Upland (pe35-42)	7,000	5,500	4,500
8962:				
Woodson	Clay Upland (pe35-42)	6,000	4,000	2,500
9967. Arents, landfill				
9971. Arents, earthen dam				
9982. Fluvents				
9983. Pits, quarries				
9984. Made land				
9986. Miscellaneous water				

Table 7.--Rangeland Productivity--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year
		Lb/acre	Lb/acre	Lb/acre
9991. Orthents				
9993. Pits				
9999. Water				

Table 8.--Forestland Productivity

Map symbol and soil name	Common trees	Site index	Volume of wood fiber	Trees to manage
			cu ft/ac	
4015:				
Chase	Black walnut	55	0	Bur oak, common hackberry, eastern cottonwood, green ash
	Bur oak	62	0	
	Common hackberry	60	0	
	Eastern cottonwood	66	0	
	Green ash	60	43	
4752:				
Sogn.				
Vinland.				
7031:				
Eudora	American sycamore	---	0	Bblack walnut, eastern cottonwood, green ash
	Black walnut	---	0	
	Common hackberry	---	0	
	Eastern cottonwood	105	143	
	Green ash	---	0	
7035:				
Eudora	American sycamore	---	0	Black walnut, eastern cottonwood, green ash
	Black walnut	---	0	
	Common hackberry	---	0	
	Eastern cottonwood	105	143	
	Green ash	---	0	
Bismarckgrove	Common hackberry	---	0	American sycamore, eastern cottonwood, green ash
	Eastern cottonwood	105	143	
	Green ash	---	0	
7036:				
Eudora	American sycamore	---	0	Black walnut, eastern cottonwood, green ash
	Black walnut	---	0	
	Common hackberry	---	0	
	Eastern cottonwood	105	143	
	Green ash	---	0	
Bismarckgrove	Common hackberry	---	0	American sycamore, eastern cottonwood, green ash
	Eastern cottonwood	105	143	
	Green ash	---	0	
7050:				
Kennebec	Black walnut	79	0	American sycamore, black walnut, bur oak, common hackberry, eastern cottonwood, green ash
	Bur oak	63	43	
	Common hackberry	---	0	
	Eastern cottonwood	---	0	
	Green ash	---	0	
7051:				
Kennebec	Black walnut	79	0	American sycamore, black walnut, bur oak, common hackberry, eastern cottonwood, green ash
	Bur oak	63	43	
	Common hackberry	---	0	
	Eastern cottonwood	---	0	
	Green ash	---	0	

Table 8.--Forestland Productivity--Continued

Map symbol and soil name	Common trees	Site index	Volume of wood fiber	Trees to manage
			cu ft/ac	
7055:				
Kimo	Common hackberry	---	0	American sycamore, eastern cottonwood, green ash
	Eastern cottonwood	90	100	
	Green ash	---	0	
	Northern red oak	---	0	
	White oak	62	43	
7089:				
Stonehouse	Eastern cottonwood	95	114	American sycamore, eastern cottonwood, silver maple
Eudora	American sycamore	---	0	Black walnut, eastern cottonwood, green ash
	Black walnut	---	0	
	Common hackberry	---	0	
	Eastern cottonwood	105	143	
	Green ash	---	0	
7090:				
Wabash	Pin oak	75	57	Eastern cottonwood, pin oak
7105:				
Belvue	American sycamore	110	157	Black walnut, eastern cottonwood
	Black walnut	---	0	
	Eastern cottonwood	110	157	
	Green ash	---	0	
7106:				
Eudora	American sycamore	---	0	Black walnut, eastern cottonwood, green ash
	Black walnut	---	0	
	Common hackberry	---	0	
	Eastern cottonwood	105	143	
	Green ash	---	0	
Bismarckgrove	Common hackberry	---	0	American sycamore, eastern cottonwood, green ash
	Eastern cottonwood	105	143	
	Green ash	---	0	
7123:				
Eudora	American sycamore	---	0	Black walnut, eastern cottonwood, green ash
	Black walnut	---	0	
	Common hackberry	---	0	
	Eastern cottonwood	105	143	
	Green ash	---	0	
7155:				
Kimo	Common hackberry	---	0	American sycamore, eastern cottonwood, green ash
	Eastern cottonwood	90	100	
	Green ash	---	0	
	Northern red oak	---	0	
	White oak	62	43	
7170:				
Reading	Black walnut	73	0	Black walnut, bur oak, common hackberry, eastern cottonwood, green ash, northern red oak
	Bur oak	60	43	
	Common hackberry	69	0	
	Northern red oak	---	0	
	Shagbark hickory	62	0	

Table 8.--Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees to manage
			cu ft/ac	
7251. Grundy				
7261. Gymer				
7285:				
Ladoga	Northern red oak	75	57	Black walnut, eastern white pine, European larch, northern red oak, red pine, sugar maple, white oak
	White oak	75	57	
7286:				
Ladoga	Northern red oak	75	57	Black walnut, eastern white pine, European larch, northern red oak, red pine, sugar maple, white oak
	White oak	75	57	
7302:				
Martin	Black walnut	68	0	Black oak, black walnut, common hackberry, green ash, white oak
	White oak	60	43	
7330:				
Martin	Black walnut	68	0	Black oak, black walnut, common hackberry, green ash, white oak
	White oak	60	43	
Vinland.				
7433:				
Morrill	Black oak	55	43	Black oak, black walnut, common hackberry, green ash, white oak
	Black walnut	---	0	
	White oak	55	43	
7460. Oska				
7462:				
Oska.				
Martin	Black walnut	68	0	Black oak, black walnut, common hackberry, green ash, white oak
	White oak	60	43	
7502. Pawnee				
7525. Chillicothe				

Table 8.--Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees to manage
			cu ft/ac	
7535. Sharpsburg				
7545:				
Sharpsburg.				
Urban land.				
7603:				
Sibleyville	Black walnut	---	0	Bur oak, common hackberry, green ash, northern red oak, white oak
	Chinkapin oak	---	0	
	Green ash	---	0	
	Shagbark hickory	---	0	
	White oak	50	29	
7607:				
Sibleyville	Black walnut	---	0	Bur oak, common hackberry, green ash, northern red oak, white oak
	Chinkapin oak	---	0	
	Green ash	---	0	
	Shagbark hickory	---	0	
	White oak	50	29	
Vinland.				
7658:				
Vinland.				
Rock outcrop.				
7805. Arisburg				
8101:				
Hepler	Common hackberry	76	0	American sycamore, green ash
	Eastern cottonwood	90	100	
	Green ash	73	72	
	Northern red oak	67	43	
	Pin oak	80	57	
8301:				
Verdigris	Black walnut	69	0	American sycamore, black walnut, eastern cottonwood, green ash, pin oak
	Common hackberry	69	0	
	Eastern cottonwood	87	100	
	Green ash	69	43	
	Pin oak	75	57	
	Shagbark hickory	---	0	
	Silver maple	---	0	
	White oak	56	43	
8302:				
Verdigris	Black walnut	69	0	American sycamore, black walnut, eastern cottonwood, green ash, pin oak
	Common hackberry	69	0	
	Eastern cottonwood	87	100	
	Green ash	69	43	
	Pin oak	75	57	
	Shagbark hickory	---	0	
	Silver maple	---	0	
	White oak	56	43	

Table 8.--Forestland Productivity--Continued

Map symbol and soil name	Common trees	Site index	Volume of wood fiber	Trees to manage
	Potential productivity			
			cu ft/ac	
8390:				
Wynona	Black walnut	---	0	American sycamore, black walnut, bur oak, eastern cottonwood, green ash
	Eastern cottonwood	90	100	
	Green ash	76	43	
	Pecan	---	0	
	Pin oak	---	0	
8501:				
Mason	Black walnut	---	0	American sycamore, black walnut, bur oak, green ash, sweetgum
	Eastern cottonwood	90	0	
	Green ash	---	0	
	Northern red oak	---	0	
	Sweetgum	---	0	
8640. Bucyrus				
8641. Bucyrus				
8663:				
Clareson.				
Rock outcrop.				
8789:				
Lebo	Chinkapin oak	---	0	Common hackberry, green ash, white oak
	Common hackberry	---	0	
	Green ash	---	0	
	Shagbark hickory	---	0	
	White oak	50	29	
8911. Summit				
8912. Summit				
8953. Wagstaff				
8955. Wagstaff				
8957:				
Wagstaff.				
Summit.				
8962. Woodson				
9967. Arents, landfill				
9971. Arents, earthen dam				
9982. Fluvents				

Table 8.--Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees to manage
			cu ft/ac	
9983. Pits, quarries				
9984. Made land				
9986. Miscellaneous water				
9991. Orthents				
9993. Pits				
9999. Water				

Table 9a.--Forest Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4015:							
Chase---------------	90	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
4752:							
Sogn----------------	55	Severe		Moderately suited		Severe	
		Restrictive layer	1.00	Slope	0.50	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
Vinland-------------	30	Moderate		Poorly suited		Severe	
		Low strength	0.50	Slope	1.00	Low strength	1.00
				Low strength	0.50		
7031:							
Eudora--------------	85	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
7035:							
Eudora--------------	55	Severe		Poorly suited		Moderate	
		Flooding	1.00	Flooding	1.00	Low strength	0.50
Bismarckgrove-------	25	Severe		Poorly suited		Moderate	
		Flooding	1.00	Flooding	1.00	Low strength	0.50
		Low strength	0.50	Landslides	0.10		
		Landslides	0.10				
7036:							
Eudora--------------	50	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
Bismarckgrove-------	25	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
		Landslides	0.10	Landslides	0.10		
7050:							
Kennebec------------	85	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
7051:							
Kennebec------------	85	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
7055:							
Kimo----------------	85	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		

Table 9a.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings: Rating class and limiting features	Value	Suitability for log landings: Rating class and limiting features	Value	Soil rutting hazard: Rating class and limiting features	Value
7089:							
Stonehouse----------	50	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
Eudora--------------	30	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
7090:							
Wabash--------------	91	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Wetness	1.00		
				Low strength	0.50		
7105:							
Belvue--------------	85	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
				Slope	0.50		
7106:							
Eudora--------------	55	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
Bismarckgrove-------	30	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
		Landslides	0.10	Landslides	0.10		
7123:							
Eudora--------------	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
7155:							
Kimo----------------	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
7170:							
Reading-------------	90	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
7251:							
Grundy--------------	100	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Wetness	0.50		
7261:							
Gymer---------------	88	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		
7285:							
Ladoga--------------	90	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		
7286:							
Ladoga--------------	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Slope	0.50	Low strength	1.00
				Low strength	0.50		

Table 9a.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings: Rating class and limiting features	Value	Suitability for log landings: Rating class and limiting features	Value	Soil rutting hazard: Rating class and limiting features	Value
7302:							
Martin	90	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
7330:							
Martin	45	Moderate		Moderately suited		Severe	
		Low strength	0.50	Slope	0.50	Low strength	1.00
				Low strength	0.50		
Vinland	40	Moderate		Moderately suited		Severe	
		Low strength	0.50	Slope	0.50	Low strength	1.00
				Low strength	0.50		
7433:							
Morrill	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		
7460:							
Oska	88	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
		Restrictive layer	0.50				
7462:							
Oska	50	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
		Restrictive layer	0.50	Slope	0.50		
Martin	30	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		
7502:							
Pawnee	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Wetness	0.50		
7525:							
Chillicothe	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
7535:							
Sharpsburg	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		
7545:							
Sharpsburg	55	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		
Urban land	45	Not rated		Not rated		Not rated	
7603:							
Sibleyville	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00

Table 9a.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7607:							
Sibleyville	45	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
Vinland	35	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
7658:							
Vinland	60	Moderate		Poorly suited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
Rock outcrop	20	Not rated		Not rated		Not rated	
7805:							
Arisburg	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Wetness	0.50		
8101:							
Hepler	90	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
				Wetness	0.50		
8301:							
Verdigris	85	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
8302:							
Verdigris	90	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
8390:							
Wynona	85	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
				Wetness	0.50		
8501:							
Mason	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
8640:							
Bucyrus	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
8641:							
Bucyrus	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		
8663:							
Clareson	60	Moderate		Moderately suited		Severe	
		Restrictive layer	0.50	Slope	0.50	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
Rock outcrop	20	Not rated		Not rated		Not rated	

Table 9a.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings: Rating class and limiting features	Value	Suitability for log landings: Rating class and limiting features	Value	Soil rutting hazard: Rating class and limiting features	Value
8789:							
Lebo	85	Moderate		Poorly suited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
8911:							
Summit	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
8912:							
Summit	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		
8953:							
Wagstaff	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
		Restrictive layer	0.50				
8955:							
Wagstaff	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
		Restrictive layer	0.50				
8957:							
Wagstaff	45	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
		Restrictive layer	0.50	Slope	0.50		
Summit	35	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		
8962:							
Woodson	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Wetness	0.50		
9967:							
Arents, landfill	100	Not rated		Not rated		Not rated	
9971:							
Arents, earthen dam	100	Not rated		Not rated		Not rated	
9982:							
Fluvents	100	Not rated		Not rated		Not rated	
9983:							
Pits, quarries	100	Not rated		Not rated		Not rated	
9984:							
Made land	100	Not rated		Not rated		Not rated	
9986:							
Miscellaneous water	100	Not rated		Not rated		Not rated	

Table 9a.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9991:							
Orthents------------	100	Not rated		Not rated		Not rated	
9993:							
Pits----------------	100	Not rated		Not rated		Not rated	
9999:							
Water---------------	100	Not rated		Not rated		Not rated	

Table 9b.--Forest Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4015:							
Chase	90	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
4752:							
Sogn	55	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
Vinland	30	Slight		Severe		Poorly suited	
				Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
7031:							
Eudora	85	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
7035:							
Eudora	55	Slight		Slight		Poorly suited	
						Flooding	1.00
Bismarckgrove	25	Slight		Slight		Poorly suited	
						Flooding	1.00
						Landslides	0.10
7036:							
Eudora	50	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
Bismarckgrove	25	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
						Landslides	0.10
7050:							
Kennebec	85	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
7051:							
Kennebec	85	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
7055:							
Kimo	85	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50

Table 9b.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion: Rating class and limiting features	Value	Hazard of erosion on roads and trails: Rating class and limiting features	Value	Suitability for roads (natural surface): Rating class and limiting features	Value
7089:							
Stonehouse	50	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
Eudora	30	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
7090:							
Wabash	91	Slight		Slight		Poorly suited	
						Flooding	1.00
						Wetness	1.00
						Low strength	0.50
7105:							
Belvue	85	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Flooding	1.00
						Low strength	0.50
						Slope	0.50
7106:							
Eudora	55	Slight		Slight		Moderately suited	
						Low strength	0.50
Bismarckgrove	30	Slight		Slight		Moderately suited	
						Low strength	0.50
						Landslides	0.10
7123:							
Eudora	85	Slight		Slight		Moderately suited	
						Low strength	0.50
7155:							
Kimo	85	Slight		Slight		Moderately suited	
						Low strength	0.50
7170:							
Reading	90	Slight		Slight		Moderately suited	
						Low strength	0.50
7251:							
Grundy	100	Slight		Slight		Moderately suited	
						Low strength	0.50
						Wetness	0.50
7261:							
Gymer	88	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
7285:							
Ladoga	90	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
7286:							
Ladoga	85	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50

Table 9b.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion: Rating class and limiting features	Value	Hazard of erosion on roads and trails: Rating class and limiting features	Value	Suitability for roads (natural surface): Rating class and limiting features	Value
7302:							
Martin	90	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
7330:							
Martin	45	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
Vinland	40	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
7433:							
Morrill	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
7460:							
Oska	88	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
7462:							
Oska	50	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
Martin	30	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
7502:							
Pawnee	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Wetness	0.50
7525:							
Chillicothe	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
7535:							
Sharpsburg	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
7545:							
Sharpsburg	55	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
Urban land	45	Not rated		Not rated		Not rated	
7603:							
Sibleyville	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50

Table 9b.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion: Rating class and limiting features	Value	Hazard of erosion on roads and trails: Rating class and limiting features	Value	Suitability for roads (natural surface): Rating class and limiting features	Value
7607:							
Sibleyville	45	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
Vinland	35	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
7658:							
Vinland	60	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
Rock outcrop	20	Not rated		Not rated		Not rated	
7805:							
Arisburg	85	Slight		Slight		Moderately suited	
						Low strength	0.50
						Wetness	0.50
8101:							
Hepler	90	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
						Wetness	0.50
8301:							
Verdigris	85	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
8302:							
Verdigris	90	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
8390:							
Wynona	85	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
						Wetness	0.50
8501:							
Mason	85	Slight		Slight		Moderately suited	
						Low strength	0.50
8640:							
Bucyrus	85	Slight		Slight		Moderately suited	
						Low strength	0.50
8641:							
Bucyrus	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
8663:							
Clareson	60	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
Rock outcrop	20	Not rated		Not rated		Not rated	

Table 9b.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion: Rating class and limiting features	Value	Hazard of erosion on roads and trails: Rating class and limiting features	Value	Suitability for roads (natural surface): Rating class and limiting features	Value
8789:							
Lebo----------------	85	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
8911:							
Summit--------------	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
8912:							
Summit--------------	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
8953:							
Wagstaff------------	85	Slight		Slight		Moderately suited	
						Low strength	0.50
8955:							
Wagstaff------------	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
8957:							
Wagstaff------------	45	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
Summit--------------	35	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
8962:							
Woodson-------------	85	Slight		Slight		Moderately suited	
						Low strength	0.50
						Wetness	0.50
9967:							
Arents, landfill----	100	Not rated		Not rated		Not rated	
9971:							
Arents, earthen dam-	100	Not rated		Not rated		Not rated	
9982:							
Fluvents------------	100	Not rated		Not rated		Not rated	
9983:							
Pits, quarries------	100	Not rated		Not rated		Not rated	
9984:							
Made land-----------	100	Not rated		Not rated		Not rated	
9986:							
Miscellaneous water-	100	Not rated		Not rated		Not rated	

Table 9b.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9991:							
Orthents	100	Not rated		Not rated		Not rated	
9993:							
Pits	100	Not rated		Not rated		Not rated	
9999:							
Water	100	Not rated		Not rated		Not rated	

Table 9c.--Forest Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4015:							
Chase	90	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
4752:							
Sogn	55	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	0.50
				Stickiness; high plasticity index	0.50		
Vinland	30	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	0.50
				Stickiness; high plasticity index	0.50		
7031:							
Eudora	85	Well suited		Well suited		Moderately suited	
						Low strength	0.50
7035:							
Eudora	55	Well suited		Well suited		Well suited	
Bismarckgrove	25	Moderately suited		Moderately suited		Well suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50		
7036:							
Eudora	50	Well suited		Well suited		Moderately suited	
						Low strength	0.50
Bismarckgrove	25	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
7050:							
Kennebec	85	Well suited		Well suited		Moderately suited	
						Low strength	0.50
7051:							
Kennebec	85	Well suited		Well suited		Moderately suited	
						Low strength	0.50
7055:							
Kimo	85	Poorly suited		Poorly suited		Moderately suited	
		Stickiness; high plasticity index	0.75	Stickiness; high plasticity index	0.75	Low strength	0.50
7089:							
Stonehouse	50	Well suited		Well suited		Moderately suited	
						Low strength	0.50
Eudora	30	Well suited		Well suited		Moderately suited	
						Low strength	0.50

Table 9c.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting: Rating class and limiting features	Value	Suitability for mechanical planting: Rating class and limiting features	Value	Suitability for use of harvesting equipment: Rating class and limiting features	Value
7090:							
Wabash	91	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
7105:							
Belvue	85	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
7106:							
Eudora	55	Well suited		Well suited		Moderately suited	
						Low strength	0.50
Bismarckgrove	30	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
7123:							
Eudora	85	Well suited		Well suited		Moderately suited	
						Low strength	0.50
7155:							
Kimo	85	Poorly suited		Poorly suited		Moderately suited	
		Stickiness; high plasticity index	0.75	Stickiness; high plasticity index	0.75	Low strength	0.50
7170:							
Reading	90	Well suited		Well suited		Moderately suited	
						Low strength	0.50
7251:							
Grundy	100	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
7261:							
Gymer	88	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
7285:							
Ladoga	90	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
7286:							
Ladoga	85	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
7302:							
Martin	90	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50

Table 9c.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting: Rating class and limiting features	Value	Suitability for mechanical planting: Rating class and limiting features	Value	Suitability for use of harvesting equipment: Rating class and limiting features	Value
7330:							
Martin	45	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	0.50
				Stickiness; high plasticity index	0.50		
Vinland	40	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	0.50
				Stickiness; high plasticity index	0.50		
7433:							
Morrill	85	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
7460:							
Oska	88	Poorly suited		Poorly suited		Moderately suited	
		Stickiness; high plasticity index	0.75	Stickiness; high plasticity index	0.75	Low strength	0.50
				Slope	0.50		
7462:							
Oska	50	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
				Slope	0.50		
Martin	30	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	0.50
				Stickiness; high plasticity index	0.50		
7502:							
Pawnee	85	Poorly suited		Poorly suited		Moderately suited	
		Stickiness; high plasticity index	0.75	Stickiness; high plasticity index	0.75	Low strength	0.50
				Slope	0.50		
7525:							
Chillicothe	85	Well suited		Well suited		Moderately suited	
						Low strength	0.50
7535:							
Sharpsburg	85	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
				Slope	0.50		
7545:							
Sharpsburg	55	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
				Slope	0.50		
Urban land	45	Not rated		Not rated		Not rated	
7603:							
Sibleyville	85	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50

Table 9c.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting: Rating class and limiting features	Value	Suitability for mechanical planting: Rating class and limiting features	Value	Suitability for use of harvesting equipment: Rating class and limiting features	Value
7607:							
Sibleyville	45	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	0.50
				Stickiness; high plasticity index	0.50		
Vinland	35	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	0.50
				Stickiness; high plasticity index	0.50		
7658:							
Vinland	60	Moderately suited		Poorly suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.75	Low strength	0.50
				Stickiness; high plasticity index	0.50	Slope	0.50
Rock outcrop	20	Not rated		Not rated		Not rated	
7805:							
Arisburg	85	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
8101:							
Hepler	90	Well suited		Well suited		Moderately suited	
						Low strength	0.50
8301:							
Verdigris	85	Well suited		Well suited		Moderately suited	
						Low strength	0.50
8302:							
Verdigris	90	Well suited		Well suited		Moderately suited	
						Low strength	0.50
8390:							
Wynona	85	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
8501:							
Mason	85	Well suited		Well suited		Moderately suited	
						Low strength	0.50
8640:							
Bucyrus	85	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
8641:							
Bucyrus	85	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	0.50
				Stickiness; high plasticity index	0.50		

Table 9c.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting: Rating class and limiting features	Value	Suitability for mechanical planting: Rating class and limiting features	Value	Suitability for use of harvesting equipment: Rating class and limiting features	Value
8663:							
Clareson	60	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Rock fragments	0.50	Low strength	0.50
				Stickiness; high plasticity index	0.50		
				Slope	0.50		
Rock outcrop	20	Not rated		Not rated		Not rated	
8789:							
Lebo	85	Moderately suited		Poorly suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.75	Low strength	0.50
				Stickiness; high plasticity index	0.50	Slope	0.50
8911:							
Summit	85	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
8912:							
Summit	85	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
				Slope	0.50		
8953:							
Wagstaff	85	Well suited		Well suited		Moderately suited	
						Low strength	0.50
8955:							
Wagstaff	85	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
8957:							
Wagstaff	45	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
Summit	35	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
				Slope	0.50		
8962:							
Woodson	85	Poorly suited		Poorly suited		Moderately suited	
		Stickiness; high plasticity index	0.75	Stickiness; high plasticity index	0.75	Low strength	0.50
9967:							
Arents, landfill	100	Not rated		Not rated		Not rated	
9971:							
Arents, earthen dam	100	Not rated		Not rated		Not rated	
9982:							
Fluvents	100	Not rated		Not rated		Not rated	
9983:							
Pits, quarries	100	Not rated		Not rated		Not rated	

Table 9c.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting: Rating class and limiting features	Value	Suitability for mechanical planting: Rating class and limiting features	Value	Suitability for use of harvesting equipment: Rating class and limiting features	Value
9984:							
Made land	100	Not rated		Not rated		Not rated	
9986:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
9991:							
Orthents	100	Not rated		Not rated		Not rated	
9993:							
Pits	100	Not rated		Not rated		Not rated	
9999:							
Water	100	Not rated		Not rated		Not rated	

Table 9d.--Forest Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
4015:					
Chase	90	Well suited		Well suited	
4752:					
Sogn	55	Well suited		Unsuited	
				Restrictive layer	1.00
Vinland	30	Well suited		Well suited	
7031:					
Eudora	85	Well suited		Well suited	
7035:					
Eudora	55	Well suited		Well suited	
Bismarckgrove	25	Well suited		Well suited	
7036:					
Eudora	50	Well suited		Well suited	
Bismarckgrove	25	Well suited		Well suited	
7050:					
Kennebec	85	Well suited		Well suited	
7051:					
Kennebec	85	Well suited		Well suited	
7055:					
Kimo	85	Poorly suited		Well suited	
		Stickiness; high plasticity index	0.50		
7089:					
Stonehouse	50	Well suited		Well suited	
Eudora	30	Well suited		Well suited	
7090:					
Wabash	91	Well suited		Well suited	
7105:					
Belvue	85	Well suited		Well suited	
7106:					
Eudora	55	Well suited		Well suited	
Bismarckgrove	30	Well suited		Well suited	
7123:					
Eudora	85	Well suited		Well suited	

Table 9d.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (surface): Rating class and limiting features	Value	Suitability for mechanical site preparation (deep): Rating class and limiting features	Value
7155:					
Kimo	85	Poorly suited		Well suited	
		Stickiness; high plasticity index	0.50		
7170:					
Reading	90	Well suited		Well suited	
7251:					
Grundy	100	Well suited		Well suited	
7261:					
Gymer	88	Well suited		Well suited	
7285:					
Ladoga	90	Well suited		Well suited	
7286:					
Ladoga	85	Well suited		Well suited	
7302:					
Martin	90	Well suited		Well suited	
7330:					
Martin	45	Well suited		Well suited	
Vinland	40	Well suited		Well suited	
7433:					
Morrill	85	Well suited		Well suited	
7460:					
Oska	88	Poorly suited		Well suited	
		Stickiness; high plasticity index	0.50		
7462:					
Oska	50	Well suited		Poorly suited	
				Restrictive layer	0.50
Martin	30	Well suited		Well suited	
7502:					
Pawnee	85	Poorly suited		Well suited	
		Stickiness; high plasticity index	0.50		
7525:					
Chillicothe	85	Well suited		Well suited	
7535:					
Sharpsburg	85	Well suited		Well suited	
7545:					
Sharpsburg	55	Well suited		Well suited	
Urban land	45	Not rated		Not rated	
7603:					
Sibleyville	85	Well suited		Well suited	

Table 9d.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
7607:					
Sibleyville	45	Well suited		Well suited	
Vinland	35	Well suited		Well suited	
7658:					
Vinland	60	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
Rock outcrop	20	Not rated		Not rated	
7805:					
Arisburg	85	Well suited		Well suited	
8101:					
Hepler	90	Well suited		Well suited	
8301:					
Verdigris	85	Well suited		Well suited	
8302:					
Verdigris	90	Well suited		Well suited	
8390:					
Wynona	85	Well suited		Well suited	
8501:					
Mason	85	Well suited		Well suited	
8640:					
Bucyrus	85	Well suited		Well suited	
8641:					
Bucyrus	85	Well suited		Well suited	
8663:					
Clareson	60	Well suited		Poorly suited	
				Rock fragments	0.50
				Restrictive layer	0.50
Rock outcrop	20	Not rated		Not rated	
8789:					
Lebo	85	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
8911:					
Summit	85	Poorly suited		Well suited	
		Stickiness; high plasticity index	0.50		
8912:					
Summit	85	Poorly suited		Well suited	
		Stickiness; high plasticity index	0.50		
8953:					
Wagstaff	85	Well suited		Poorly suited	
				Restrictive layer	0.50

Table 9d.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
8955:					
Wagstaff------------	85	Well suited		Poorly suited	
				Restrictive layer	0.50
8957:					
Wagstaff------------	45	Well suited		Poorly suited	
				Restrictive layer	0.50
Summit--------------	35	Poorly suited		Well suited	
		Stickiness; high plasticity index	0.50		
8962:					
Woodson-------------	85	Poorly suited		Well suited	
		Stickiness; high plasticity index	0.50		
9967:					
Arents, landfill----	100	Not rated		Not rated	
9971:					
Arents, earthen dam-	100	Not rated		Not rated	
9982:					
Fluvents------------	100	Not rated		Not rated	
9983:					
Pits, quarries------	100	Not rated		Not rated	
9984:					
Made land-----------	100	Not rated		Not rated	
9986:					
Miscellaneous water-	100	Not rated		Not rated	
9991:					
Orthents------------	100	Not rated		Not rated	
9993:					
Pits----------------	100	Not rated		Not rated	
9999:					
Water---------------	100	Not rated		Not rated	

Table 9e.--Forest Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
4015:					
Chase	90	Low		Low	
		Texture/rock fragments	0.10		
4752:					
Sogn	55	Low		Low	
		Texture/rock fragments	0.10		
Vinland	30	Low		Low	
		Texture/rock fragments	0.10		
7031:					
Eudora	85	Moderate		Low	
		Texture/rock fragments	0.50		
7035:					
Eudora	55	Moderate		Low	
		Texture/rock fragments	0.50		
Bismarckgrove	25	Moderate		Low	
		Texture/rock fragments	0.50		
7036:					
Eudora	50	Moderate		Low	
		Texture/rock fragments	0.50		
Bismarckgrove	25	Low		Low	
		Texture/rock fragments	0.10		
7050:					
Kennebec	85	Low		Low	
		Texture/rock fragments	0.10		
7051:					
Kennebec	85	Low		Low	
		Texture/rock fragments	0.10		
7055:					
Kimo	85	Low		Low	

Table 9e.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire: Rating class and limiting features	Value	Potential for seedling mortality: Rating class and limiting features	Value
7089:					
Stonehouse	50	Moderate		Low	
		Texture/rock fragments	0.50		
Eudora	30	Moderate		Low	
		Texture/rock fragments	0.50		
7090:					
Wabash	91	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
7105:					
Belvue	85	Moderate		Low	
		Texture/rock fragments	0.50		
7106:					
Eudora	55	Moderate		Low	
		Texture/rock fragments	0.50		
Bismarckgrove	30	Low		Low	
		Texture/rock fragments	0.10		
7123:					
Eudora	85	Moderate		Low	
		Texture/rock fragments	0.50		
7155:					
Kimo	85	Low		Low	
7170:					
Reading	90	Low		Low	
		Texture/rock fragments	0.10		
7251:					
Grundy	100	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
7261:					
Gymer	88	Low		Low	
		Texture/rock fragments	0.10		
7285:					
Ladoga	90	Low		Low	
		Texture/rock fragments	0.10		
7286:					
Ladoga	85	Low		Low	
		Texture/rock fragments	0.10		

Table 9e.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire: Rating class and limiting features	Value	Potential for seedling mortality: Rating class and limiting features	Value
7302:					
Martin	90	Low		Low	
		Texture/rock fragments	0.10		
7330:					
Martin	45	Low		Low	
		Texture/rock fragments	0.10		
Vinland	40	Low		Low	
7433:					
Morrill	85	Low		Low	
		Texture/rock fragments	0.10		
7460:					
Oska	88	Low		Low	
		Texture/rock fragments	0.10		
7462:					
Oska	50	Low		Low	
		Texture/rock fragments	0.10		
Martin	30	Low		Low	
		Texture/rock fragments	0.10		
7502:					
Pawnee	85	Low		High	
				Wetness	1.00
7525:					
Chillicothe	85	Low		Low	
		Texture/rock fragments	0.10		
7535:					
Sharpsburg	85	Low		Low	
		Texture/rock fragments	0.10		
7545:					
Sharpsburg	55	Low		Low	
		Texture/rock fragments	0.10		
Urban land	45	Not rated		Not rated	
7603:					
Sibleyville	85	Low		Low	
		Texture/rock fragments	0.10		

Table 9e.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire: Rating class and limiting features	Value	Potential for seedling mortality: Rating class and limiting features	Value
7607:					
Sibleyville	45	Low		Low	
		Texture/rock fragments	0.10		
Vinland	35	Low		Low	
7658:					
Vinland	60	Low		Low	
Rock outcrop	20	Not rated		Not rated	
7805:					
Arisburg	85	Low		Low	
		Texture/rock fragments	0.10		
8101:					
Hepler	90	Moderate		High	
		Texture/rock fragments	0.50	Wetness	1.00
8301:					
Verdigris	85	Low		Low	
		Texture/rock fragments	0.10		
8302:					
Verdigris	90	Low		Low	
		Texture/rock fragments	0.10		
8390:					
Wynona	85	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
8501:					
Mason	85	Low		Low	
		Texture/rock fragments	0.10		
8640:					
Bucyrus	85	Low		Low	
		Texture/rock fragments	0.10		
8641:					
Bucyrus	85	Low		Low	
		Texture/rock fragments	0.10		
8663:					
Clareson	60	Low		Low	
		Texture/rock fragments	0.10		
Rock outcrop	20	Not rated		Not rated	

Table 9e.--Forest Management--Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire: Rating class and limiting features	Value	Potential for seedling mortality: Rating class and limiting features	Value
8789:					
Lebo	85	Low		Low	
		Texture/rock fragments	0.10		
8911:					
Summit	85	Low		Low	
8912:					
Summit	85	Low		Low	
8953:					
Wagstaff	85	Low		Low	
		Texture/rock fragments	0.10		
8955:					
Wagstaff	85	Low		Low	
		Texture/rock fragments	0.10		
8957:					
Wagstaff	45	Low		Low	
		Texture/rock fragments	0.10		
Summit	35	Low		Low	
8962:					
Woodson	85	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
9967:					
Arents, landfill	100	Not rated		Not rated	
9971:					
Arents, earthen dam	100	Not rated		Not rated	
9982:					
Fluvents	100	Not rated		Not rated	
9983:					
Pits, quarries	100	Not rated		Not rated	
9984:					
Made land	100	Not rated		Not rated	
9986:					
Miscellaneous water	100	Not rated		Not rated	
9991:					
Orthents	100	Not rated		Not rated	
9993:					
Pits	100	Not rated		Not rated	
9999:					
Water	100	Not rated		Not rated	

Table 10.--Windbreaks and Environmental Plantings

(Absence of an entry indicates that trees generally do not grow to the given height.)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
4015:					
Chase	American hazelnut; blackhaw; chickasaw plum; forsythia; golden currant; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk	American plum; amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; common lilac; Siberian peashrub; tatarian honeysuckle	Blue spruce; Douglas fir; eastern redbud; eastern redcedar; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Scotch pine; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white spruce	American basswood; American sycamore; Austrian pine; bitternut hickory; black cherry; black locust; black oak; black walnut; black willow; bur oak; chinkapin oak; common hackberry; eastern white pine; golden willow; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; peachleaf willow; pecan; pin oak; shagbark hickory; shellbark hickory; sugar maple; white oak	'Mighty Mo' eastern cottonwood; 'Nor'easter' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; Siberian elm; silver maple
4752:					
Sogn.					
Vinland.					
7031:					
Eudora	American hazelnut; blackhaw; forsythia; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk	American plum; amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; common lilac; Siberian peashrub; tatarian honeysuckle	Blue spruce; Douglas fir; eastern redbud; eastern redcedar; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Scotch pine; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white spruce	American basswood; American sycamore; Austrian pine; bitternut hickory; black cherry; black locust; black oak; black walnut; black willow; bur oak; chinkapin oak; common hackberry; eastern white pine; golden willow; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; peachleaf willow; pecan; pin oak; shagbark hickory; shellbark hickory; sugar maple; white oak	'Mighty Mo' eastern cottonwood; 'Nor'easter' eastern cottonwood; 'Ohio Red' eastern cottonwood; Siberian elm; silver maple

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
7035:					
Eudora	American hazelnut; blackhaw; forsythia; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk	American plum; amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; common lilac; Siberian peashrub; tatarian honeysuckle	Blue spruce; Douglas fir; eastern redbud; eastern redcedar; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Scotch pine; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white spruce	American basswood; American sycamore; Austrian pine; bitternut hickory; black cherry; black locust; black oak; black walnut; black willow; bur oak; chinkapin oak; common hackberry; eastern white pine; golden willow; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; peachleaf willow; pecan; pin oak; shagbark hickory; shellbark hickory; sugar maple; white oak	'Mighty Mo' eastern cottonwood; 'Nor'easter' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; Siberian elm; silver maple
Bismarckgrove	American plum; amur privet; forsythia; golden currant; hazelnut; Nanking cherry; redosier dogwood; roughleaf dogwood	Amur honeysuckle; amur maple; autumn-olive; common lilac; Peking cotoneaster	Wastern redcedar; Manchurian crabapple; osageorange; red mulberry; western soapberry	Austrian pine; Austrian pine; black oak; common hackberry; eastern white pine; eastern white pine; green ash; honeylocust; peachleaf willow; pin oak; shagbark hickory; sugar maple	Black cherry; boxelder; eastern cottonwood; 'Mighty Mo' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; Kentucky coffeetree; pecan; shellbark hickory

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
7036:					
Eudora	American hazelnut; blackhaw; forsythia; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk	American plum; amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; common lilac; Siberian peashrub; tatarian honeysuckle	Blue spruce; Douglas fir; eastern redbud; eastern redcedar; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Scotch pine; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white spruce	American basswood; American sycamore; Austrian pine; bitternut hickory; black cherry; black locust; black oak; black walnut; black willow; bur oak; chinkapin oak; common hackberry; eastern white pine; golden willow; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; peachleaf willow; pecan; pin oak; shagbark hickory; shellbark hickory; sugar maple; white oak	'Mighty Mo' eastern cottonwood; 'Nor'easter' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; Siberian elm; silver maple
Bismarckgrove	American plum; amur privet; forsythia; golden currant; hazelnut; Nanking cherry; redosier dogwood; roughleaf dogwood	Amur honeysuckle; amur maple; autumn-olive; common lilac; Peking cotoneaster	Eastern redcedar; Manchurian crabapple; osageorange; red mulberry; western soapberry	Austrian pine; Austrian pine; black oak; common hackberry; eastern white pine; eastern white pine; green ash; honeylocust; peachleaf willow; pin oak; shagbark hickory; sugar maple	Black cherry; boxelder; eastern cottonwood; 'Mighty Mo' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; Kentucky coffeetree; pecan; shellbark hickory

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
7050:					
Kennebec	Blackhaw; forsythia; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac	American plum; amur maple; amur privet; common chokecherry; common lilac; Siberian peashrub	Blue spruce; eastern redbud; eastern redcedar; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Siberian crabapple; Washington hawthorn; white fir; white spruce	American basswood; American sycamore; bitternut hickory; black cherry; black locust; black oak; black walnut; black willow; bur oak; chinkapin oak; common hackberry; golden willow; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; peachleaf willow; pecan; pin oak; shagbark hickory; shellbark hickory; sugar maple; white oak	'Mighty Mo' eastern cottonwood; 'Nor'easter' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood
7051:					
Kennebec	Blackhaw; forsythia; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac	American plum; amur maple; amur privet; common chokecherry; common lilac; Siberian peashrub	Blue spruce; eastern redbud; eastern redcedar; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Siberian crabapple; Washington hawthorn; white fir; white spruce	American basswood; American sycamore; bitternut hickory; black cherry; black locust; black oak; black walnut; black willow; bur oak; chinkapin oak; common hackberry; golden willow; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; peachleaf willow; pecan; pin oak; shagbark hickory; shellbark hickory; sugar maple; white oak	'Mighty Mo' eastern cottonwood; 'Nor'easter' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood
7055:					
Kimo	Buttonbush; silky dogwood	Possumhaw	Eastern redcedar; nannyberry	Baldcypress; black willow; common hackberry; golden willow; peachleaf willow; pin oak; red mulberry; Russian mulberry; shellbark hickory; silver maple	American sycamore; eastern cottonwood; 'Mighty Mo' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; honeylocust; Kentucky coffeetree; pecan

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
7089:					
Stonehouse	Nanking cherry; 'Konza' fragrant sumac; tamarisk	American plum; amur maple; amur privet; common chokecherry; common lilac; Siberian peashrub	Eastern redbud; eastern redcedar; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Scotch pine; Washington hawthorn; western soapberry	American basswood; American sycamore; Austrian pine; black locust; bur oak; common hackberry; eastern white pine; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa	Eastern cottonwood; Siberian elm
Eudora	Blackhaw; forsythia; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac	American plum; amur maple; amur privet; common chokecherry; common lilac; Siberian peashrub	Blue spruce; eastern redbud; eastern redcedar; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Siberian crabapple; Washington hawthorn; white fir; white spruce	American basswood; American sycamore; bitternut hickory; black cherry; black locust; black oak; black walnut; black willow; bur oak; chinkapin oak; common hackberry; golden willow; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; peachleaf willow; pecan; pin oak; shagbark hickory; shellbark hickory; sugar maple; white oak	'Mighty Mo' eastern cottonwood; 'Nor'easter' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood
7090:					
Wabash	American plum; blackhaw; forsythia; golden currant; gray dogwood; redosier dogwood; Siberian peashrub; 'Konza' fragrant sumac; tamarisk	Amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; common lilac; tatarian honeysuckle	Common hackberry; Douglas fir; eastern redbud; eastern redcedar; oriental arborvitae; osageorange; Siberian crabapple; Washington hawthorn; western soapberry; white fir	American basswood; American sycamore; Austrian pine; bitternut hickory; black locust; black willow; blue spruce; bur oak; eastern white pine; golden willow; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway spruce; peachleaf willow; pecan; pin oak; red mulberry; Russian mulberry; Scotch pine; shellbark hickory; white spruce	'Mighty Mo' eastern cottonwood; 'Nor'easter' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; Siberian elm; silver maple

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
7105:					
Belvue	Dorsythia; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk	American plum; amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; common lilac; Siberian peashrub; tatarian honeysuckle	Blue spruce; Douglas fir; eastern redbud; eastern redcedar; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Scotch pine; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white spruce	American basswood; American sycamore; Austrian pine; bitternut hickory; black cherry; black locust; black oak; black walnut; black willow; bur oak; chinkapin oak; common hackberry; eastern white pine; golden willow; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; peachleaf willow; pecan; pin oak; shagbark hickory; shellbark hickory; sugar maple; white oak	'Mighty Mo' eastern cottonwood; 'Nor'easter' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; Siberian elm; silver maple
7106:					
Eudora	American hazelnut; blackhaw; forsythia; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk	American plum; amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; common lilac; Siberian peashrub; tatarian honeysuckle	Blue spruce; Douglas fir; eastern redbud; eastern redcedar; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Scotch pine; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white spruce	American basswood; American sycamore; Austrian pine; bitternut hickory; black cherry; black locust; black oak; black walnut; black willow; bur oak; chinkapin oak; common hackberry; eastern white pine; golden willow; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; peachleaf willow; pecan; pin oak; shagbark hickory; shellbark hickory; sugar maple; white oak	'Mighty Mo' eastern cottonwood; 'Nor'easter' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; Siberian elm; silver maple

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
7106: Bismarckgrove	American plum; amur privet; forsythia; golden currant; hazelnut; Nanking cherry; redosier dogwood; roughleaf dogwood	Amur honeysuckle; amur maple; autumn-olive; common lilac; Peking cotoneaster	Eastern redcedar; Manchurian crabapple; osageorange; red mulberry; western soapberry	Austrian pine; Austrian pine; black oak; common hackberry; eastern white pine; eastern white pine; green ash; honeylocust; peachleaf willow; pin oak; shagbark hickory; sugar maple	Black cherry; boxelder; eastern cottonwood; 'Mighty Mo' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; Kentucky coffeetree; pecan; shellbark hickory
7123: Eudora	American hazelnut; blackhaw; forsythia; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk	American plum; amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; common lilac; Siberian peashrub; tatarian honeysuckle	Blue spruce; Douglas fir; eastern redbud; eastern redcedar; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Scotch pine; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white spruce	American basswood; American sycamore; Austrian pine; bitternut hickory; black cherry; black locust; black oak; black walnut; black willow; bur oak; chinkapin oak; common hackberry; eastern white pine; golden willow; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; peachleaf willow; pecan; pin oak; shagbark hickory; shellbark hickory; sugar maple; white oak	'Mighty Mo' eastern cottonwood; 'Nor'easter' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; Siberian elm; silver maple
7155: Kimo	Buttonbush; silky dogwood	Possumhaw	Eastern redcedar; nannyberry	Baldcypress; black willow; common hackberry; golden willow; peachleaf willow; pin oak; red mulberry; Russian mulberry; shellbark hickory; silver maple	American sycamore; eastern cottonwood; 'Mighty Mo' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; honeylocust; Kentucky coffeetree; pecan

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
7170: Reading	American hazelnut; blackhaw; chickasaw plum; forsythia; golden currant; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk	American plum; amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; common lilac; Siberian peashrub; tatarian honeysuckle	Blue spruce; Douglas fir; eastern redbud; eastern redcedar; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Scotch pine; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white spruce	American basswood; American sycamore; Austrian pine; bitternut hickory; black cherry; black locust; black oak; black walnut; black willow; bur oak; chinkapin oak; common hackberry; eastern white pine; golden willow; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; peachleaf willow; pecan; pin oak; shagbark hickory; shellbark hickory; sugar maple; white oak	'Mighty Mo' eastern cottonwood; 'Nor'easter' eastern cottonwood; 'Ohio Red' eastern cottonwood; 'Platte' eastern cottonwood; Siberian elm; silver maple
7251: Grundy	American hazelnut; common lilac; Siberian peashrub; tamarisk; tatarian honeysuckle	'Cardinal' autumn-olive; eastern redcedar; Siberian crabapple	Austrian pine; bitternut hickory; black locust; black oak; chinkapin oak; common hackberry; green ash; honeylocust; northern catalpa; osageorange; pin oak; red mulberry; Russian mulberry; Russian olive; western soapberry; white oak	Siberian elm	---
7261: Gymer	American hazelnut; common lilac; Siberian peashrub; tamarisk; tatarian honeysuckle	'Cardinal' autumn-olive; eastern redcedar; Siberian crabapple	Austrian pine; bitternut hickory; black locust; black oak; chinkapin oak; common hackberry; green ash; honeylocust; northern catalpa; osageorange; pin oak; red mulberry; Russian mulberry; Russian olive; western soapberry; white oak	Siberian elm	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
7285:					
Ladoga	American hazelnut; American plum; blackhaw; chickasaw plum; common lilac; forsythia; golden currant; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk; tatarian honeysuckle	Amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; Siberian peashrub	Blue spruce; bur oak; chinkapin oak; common hackberry; Douglas fir; eastern redcedar; eastern white pine; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white oak; white spruce	American basswood; Austrian pine; bitternut hickory; black locust; black oak; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; pecan; pin oak; Scotch pine; silver maple; sugar maple	Siberian elm
7286:					
Ladoga	American hazelnut; American plum; blackhaw; chickasaw plum; common lilac; forsythia; golden currant; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk; tatarian honeysuckle	Amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; Siberian peashrub	Blue spruce; bur oak; chinkapin oak; common hackberry; Douglas fir; eastern redcedar; eastern white pine; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white oak; white spruce	American basswood; Austrian pine; bitternut hickory; black locust; black oak; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; pecan; pin oak; Scotch pine; silver maple; sugar maple	Siberian elm
7302:					
Martin	American hazelnut; common lilac; Siberian peashrub; tamarisk; tatarian honeysuckle	'Cardinal' autumn-olive; eastern redcedar; Siberian crabapple	Austrian pine; bitternut hickory; black locust; black oak; chinkapin oak; common hackberry; green ash; honeylocust; northern catalpa; osageorange; pin oak; red mulberry; Russian mulberry; Russian olive; western soapberry; white oak	Siberian elm	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
7330:					
Martin	American hazelnut; common lilac; Siberian peashrub; tamarisk; tatarian honeysuckle	'Cardinal' autumn-olive; eastern redcedar; Siberian crabapple	Austrian pine; bitternut hickory; black locust; black oak; chinkapin oak; common hackberry; green ash; honeylocust; northern catalpa; osageorange; pin oak; red mulberry; Russian mulberry; Russian olive; western soapberry; white oak	Siberian elm	---
Vinland.					
7433:					
Morrill	American hazelnut; American plum; blackhaw; chickasaw plum; common lilac; forsythia; golden currant; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk; tatarian honeysuckle	Amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; Siberian peashrub	Blue spruce; bur oak; chinkapin oak; common hackberry; Douglas fir; eastern redcedar; eastern white pine; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white oak; white spruce	American basswood; Austrian pine; bitternut hickory; black locust; black oak; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; pecan; pin oak; Scotch pine; silver maple; sugar maple	Siberian elm
7460:					
Oska	American hazelnut; common lilac; golden currant; Siberian peashrub; 'Konza' fragrant sumac; tamarisk	'Cardinal' autumn-olive; 'Elsberry' autumn-olive; eastern redcedar; Siberian crabapple; tatarian honeysuckle	Austrian pine; bitternut hickory; black locust; black oak; bur oak; chinkapin oak; common hackberry; green ash; honeylocust; northern catalpa; osageorange; red mulberry; Russian mulberry; Russian olive; sugar maple; western soapberry; white oak	Norway maple; Siberian elm	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
7462:					
Oska	American hazelnut; common lilac; golden currant; Siberian peashrub; 'Konza' fragrant sumac; tamarisk	'Cardinal' autumn-olive; 'Elsberry' autumn-olive; eastern redcedar; Siberian crabapple; tatarian honeysuckle	Austrian pine; bitternut hickory; black locust; black oak; bur oak; chinkapin oak; common hackberry; green ash; honeylocust; northern catalpa; osageorange; red mulberry; Russian mulberry; Russian olive; sugar maple; western soapberry; white oak	Norway maple; Siberian elm	---
Martin	American hazelnut; common lilac; Siberian peashrub; tamarisk; tatarian honeysuckle	'Cardinal' autumn-olive; eastern redcedar; Siberian crabapple	Austrian pine; bitternut hickory; black locust; black oak; chinkapin oak; common hackberry; green ash; honeylocust; northern catalpa; osageorange; pin oak; red mulberry; Russian mulberry; Russian olive; western soapberry; white oak	Siberian elm	---
7502:					
Pawnee	American hazelnut; common lilac; Siberian peashrub; tamarisk; tatarian honeysuckle	'Cardinal' autumn-olive; eastern redcedar; Siberian crabapple	Austrian pine; bitternut hickory; black locust; black oak; chinkapin oak; common hackberry; green ash; honeylocust; northern catalpa; osageorange; pin oak; red mulberry; Russian mulberry; Russian olive; western soapberry; white oak	Siberian elm	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
7525:					
Chillicothe	American hazelnut; American plum; blackhaw; chickasaw plum; common lilac; forsythia; golden currant; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk; tatarian honeysuckle	Amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; Siberian peashrub	Blue spruce; bur oak; chinkapin oak; common hackberry; Douglas fir; eastern redcedar; eastern white pine; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white oak; white spruce	American basswood; Austrian pine; bitternut hickory; black locust; black oak; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; pecan; pin oak; Scotch pine; silver maple; sugar maple	Siberian elm
7535:					
Sharpsburg	American hazelnut; American plum; blackhaw; chickasaw plum; common lilac; forsythia; golden currant; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk; tatarian honeysuckle	Amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; Siberian peashrub	Blue spruce; bur oak; chinkapin oak; common hackberry; Douglas fir; eastern redcedar; eastern white pine; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white oak; white spruce	American basswood; Austrian pine; bitternut hickory; black locust; black oak; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; pecan; pin oak; Scotch pine; silver maple; sugar maple	Siberian elm
7545:					
Sharpsburg	American hazelnut; American plum; blackhaw; chickasaw plum; common lilac; forsythia; golden currant; gray dogwood; Nanking cherry; redosier dogwood; 'Konza' fragrant sumac; tamarisk; tatarian honeysuckle	Amur maple; amur privet; 'Cardinal' autumn-olive; 'Elsberry' autumn-olive; common chokecherry; Siberian peashrub	Blue spruce; bur oak; chinkapin oak; common hackberry; Douglas fir; eastern redcedar; eastern white pine; oriental arborvitae; osageorange; red mulberry; Russian mulberry; Russian olive; Siberian crabapple; Washington hawthorn; western soapberry; white fir; white oak; white spruce	American basswood; Austrian pine; bitternut hickory; black locust; black oak; green ash; honeylocust; Kentucky coffeetree; lacebark elm; northern catalpa; northern red oak; Norway maple; Norway spruce; pecan; pin oak; Scotch pine; silver maple; sugar maple	Siberian elm
Urban land.					

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
7603:					
Sibleyville--------	Amur honeysuckle; common lilac	Autumn-olive	Austrian pine; bur oak; common hackberry; eastern redcedar; green ash; Russian olive	Honeylocust; Siberian elm	---
7607:					
Sibleyville--------	American hazelnut; common lilac; golden currant; Siberian peashrub; 'Konza' fragrant sumac; tamarisk	'Cardinal' autumn-olive; 'Elsberry' autumn-olive; eastern redcedar; Siberian crabapple; tatarian honeysuckle	Austrian pine; bitternut hickory; black locust; black oak; bur oak; chinkapin oak; common hackberry; green ash; honeylocust; northern catalpa; osageorange; red mulberry; Russian mulberry; Russian olive; sugar maple; western soapberry; white oak	Norway maple; Siberian elm	---
Vinland.					
7658:					
Vinland.					
Rock outcrop.					
7805:					
Arisburg-----------	American plum; redosier dogwood	---	Amur maple; eastern redcedar	Austrian pine; common hackberry; green ash; Norway spruce; silver maple	Eastern cottonwood; eastern white pine
8101:					
Hepler-------------	American plum	Amur honeysuckle; common lilac	Eastern redcedar	Austrian pine; bur oak; common hackberry; eastern white pine; green ash; honeylocust	Eastern cottonwood
8301:					
Verdigris----------	Amur honeysuckle; common lilac	Amur maple; autumn-olive	Austrian pine; eastern redcedar; green ash; hackberry; pin oak	Eastern white pine; honeylocust	Eastern cottonwood
8302:					
Verdigris----------	Amur honeysuckle; common lilac	Amur maple; autumn-olive	Austrian pine; eastern redcedar; green ash; hackberry; pin oak	Eastern white pine; honeylocust	Eastern cottonwood
8390:					
Wynona-------------	Skunkbush sumac	Common lilac	American plum; amur honeysuckle	Common hackberry; osageorange; redbud	American sycamore; eastern cottonwood; green ash; honeylocust; silver maple

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
8501:					
Mason	American plum	Amur honeysuckle; common lilac	Eastern redcedar	Austrian pine; bur oak; common hackberry; eastern white pine; green ash; honeylocust	Eastern cottonwood
8640:					
Bucyrus	Amur honeysuckle; common lilac	---	Bur oak; common hackberry; eastern redcedar; Russian olive	Austrian pine; green ash; honeylocust; Scotch pine	---
8641:					
Bucyrus	Amur honeysuckle; common lilac	---	Bur oak; common hackberry; eastern redcedar; Russian olive	Austrian pine; green ash; honeylocust; Scotch pine	---
8663:					
Clareson	Amur honeysuckle; common lilac	---	Austrian pine; bur oak; common hackberry; eastern redcedar; green ash; Russian olive	Honeylocust; Siberian elm	---
Rock outcrop.					
8789:					
Lebo	Amur honeysuckle; common lilac	---	Austrian pine; bur oak; common hackberry; eastern redcedar; green ash; Russian olive	Honeylocust; Siberian elm	---
8911:					
Summit	Amur honeysuckle; skunkbush sumac	Amur maple; Austrian pine; autumn-olive; Manchurian crabapple; redbud	Eastern redcedar; green ash; hackberry; honeylocust; jack pine; lacebark elm; oriental arborvitae; osageorange; Russian olive; silver maple	---	---
8912:					
Summit	Skunkbush sumac	Amur maple; Austrian pine; autumn-olive; Manchurian crabapple; redbud	Eastern redcedar; green ash; hackberry; honeylocust; jack pine; lacebark elm; oriental arborvitae; osageorange; Russian olive; silver maple	---	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
8953:					
Wagstaff-----------	Amur honeysuckle; common lilac	Siberian peashrub	Austrian pine; common hackberry; eastern redcedar; green ash; Manchurian crabapple; Russian olive	Honeylocust; Siberian elm	---
8955:					
Wagstaff-----------	Amur honeysuckle; common lilac	Siberian peashrub	Austrian pine; common hackberry; eastern redcedar; green ash; Manchurian crabapple; Russian olive	Honeylocust; Siberian elm	---
8957:					
Wagstaff-----------	Amur honeysuckle; common lilac	Siberian peashrub	Austrian pine; common hackberry; eastern redcedar; green ash; Manchurian crabapple; Russian olive	Honeylocust; Siberian elm	---
Summit-------------	Skunkbush sumac	Amur maple; Austrian pine; autumn-olive; Manchurian crabapple; redbud	Eastern redcedar; green ash; hackberry; honeylocust; jack pine; lacebark elm; oriental arborvitae; osageorange; Russian olive; silver maple	---	---
8962:					
Woodson------------	Amur honeysuckle; common lilac	---	Common hackberry; eastern redcedar; green ash; Manchurian crabapple; Russian olive	Austrian pine; honeylocust; Siberian elm	---
9967. Arents, landfill					
9971. Arents, earthen dam					
9982. Fluvents					
9983. Pits, quarries					
9984. Made land					
9986. Miscellaneous water					
9991. Orthents					

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
9993. Pits					
9999. Water					

Table 11a.--Recreation

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Value	Picnic areas: Rating class and limiting features	Value	Playgrounds: Rating class and limiting features	Value
4015:							
Chase	90	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Restricted permeability	0.94	Restricted permeability	0.94
		Restricted permeability	0.94	Depth to saturated zone	0.19	Flooding	0.60
		Depth to saturated zone	0.39			Depth to saturated zone	0.39
4752:							
Sogn	55	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.16	Slope	0.16	Slope	1.00
						Gravel content	0.45
Vinland	30	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.84	Slope	0.84	Slope	1.00
						Gravel content	0.72
7031:							
Eudora	85	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
7035:							
Eudora	55	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
Bismarckgrove	25	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Restricted permeability	0.15	Flooding	0.60
		Restricted permeability	0.15			Restricted permeability	0.15
7036:							
Eudora	50	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
Bismarckgrove	25	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Restricted permeability	0.15	Flooding	0.60
		Restricted permeability	0.15			Restricted permeability	0.15
7050:							
Kennebec	85	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
7051:							
Kennebec	85	Very limited		Somewhat limited		Very limited	
		Flooding	1.00	Flooding	0.40	Flooding	1.00
7055:							
Kimo	85	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Restricted permeability	0.94	Restricted permeability	0.94
		Restricted permeability	0.94	Depth to saturated zone	0.19	Flooding	0.60
		Depth to saturated zone	0.39			Depth to saturated zone	0.39

Table 11a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Value	Picnic areas: Rating class and limiting features	Value	Playgrounds: Rating class and limiting features	Value
7089:							
Stonehouse----------	50	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
Eudora--------------	30	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
7090:							
Wabash--------------	91	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Restricted permeability	1.00			Flooding	0.60
7105:							
Belvue--------------	85	Very limited		Not limited		Very limited	
		Flooding	1.00			Slope	1.00
						Flooding	0.60
7106:							
Eudora--------------	55	Very limited		Not limited		Not limited	
		Flooding	1.00				
Bismarckgrove-------	30	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Restricted permeability	0.15	Restricted permeability	0.15
		Restricted permeability	0.15				
7123:							
Eudora--------------	85	Very limited		Not limited		Not limited	
		Flooding	1.00				
7155:							
Kimo----------------	85	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Restricted permeability	0.94	Restricted permeability	0.94
		Restricted permeability	0.94	Depth to saturated zone	0.19	Depth to saturated zone	0.39
		Depth to saturated zone	0.39				
7170:							
Reading-------------	90	Very limited		Not limited		Not limited	
		Flooding	1.00				
7251:							
Grundy--------------	100	Very limited		Somewhat limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	0.96	Depth to saturated zone	1.00
		Restricted permeability	0.94	Restricted permeability	0.94	Restricted permeability	0.94
7261:							
Gymer---------------	88	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.15	Restricted permeability	0.15	Slope	1.00
						Restricted permeability	0.15

Table 11a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
7285:							
Ladoga	90	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.15	Restricted permeability	0.15	Slope	1.00
						Restricted permeability	0.15
7286:							
Ladoga	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Restricted permeability	0.15	Restricted permeability	0.15	Restricted permeability	0.15
7302:							
Martin	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Restricted permeability	0.94
		Depth to saturated zone	0.39	Depth to saturated zone	0.19	Slope	0.50
						Depth to saturated zone	0.39
7330:							
Martin	45	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Slope	1.00
		Depth to saturated zone	0.39	Depth to saturated zone	0.19	Restricted permeability	0.94
		Slope	0.04	Slope	0.04	Depth to saturated zone	0.39
Vinland	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Depth to bedrock	1.00
						Gravel content	0.72
7433:							
Morrill	85	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.15	Restricted permeability	0.15	Slope	1.00
						Gravel content	0.32
						Restricted permeability	0.15
7460:							
Oska	88	Somewhat limited		Somewhat limited		Somewhat limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Restricted permeability	0.94
						Slope	0.88
						Depth to bedrock	0.01
7462:							
Oska	50	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Slope	1.00
						Restricted permeability	0.94
						Depth to bedrock	0.29
Martin	30	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Slope	1.00
		Depth to saturated zone	0.39	Depth to saturated zone	0.19	Restricted permeability	0.94
						Depth to saturated zone	0.39

Table 11a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
7502:							
Pawnee	85	Very limited		Somewhat limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	0.96	Depth to saturated zone	1.00
		Restricted permeability	0.94	Restricted permeability	0.94	Restricted permeability	0.94
						Slope	0.88
7525:							
Chillicothe	85	Not limited		Not limited		Somewhat limited	
						Slope	0.50
7535:							
Sharpsburg	85	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.15	Restricted permeability	0.15	Slope	1.00
						Restricted permeability	0.15
7545:							
Sharpsburg	55	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.15	Restricted permeability	0.15	Slope	1.00
						Restricted permeability	0.15
Urban land	45	Not rated		Not rated		Not rated	
7603:							
Sibleyville	85	Not limited		Not limited		Somewhat limited	
						Slope	0.88
						Depth to bedrock	0.71
7607:							
Sibleyville	45	Not limited		Not limited		Somewhat limited	
						Slope	0.88
						Depth to bedrock	0.54
Vinland	35	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Gravel content	0.88
						Slope	0.88
7658:							
Vinland	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Gravel content	0.88
Rock outcrop	20	Not rated		Not rated		Not rated	
7805:							
Arisburg	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.98	Depth to saturated zone	0.75	Depth to saturated zone	0.98
		Restricted permeability	0.15	Restricted permeability	0.15	Restricted permeability	0.15
8101:							
Hepler	90	Very limited		Somewhat limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	0.96	Depth to saturated zone	1.00
		Flooding	1.00			Flooding	0.60

Table 11a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
8301:							
Verdigris-----------	85	Very limited		Somewhat limited		Very limited	
		Flooding	1.00	Flooding	0.40	Flooding	1.00
8302:							
Verdigris-----------	90	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
8390:							
Wynona--------------	85	Very limited		Somewhat limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	0.96	Depth to saturated zone	1.00
		Flooding	1.00	Restricted permeability	0.94	Restricted permeability	0.94
		Restricted permeability	0.94			Flooding	0.60
8501:							
Mason---------------	85	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Restricted permeability	0.15	Restricted permeability	0.15
		Restricted permeability	0.15				
8640:							
Bucyrus-------------	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Restricted permeability	0.94
8641:							
Bucyrus-------------	85	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Slope	1.00
						Restricted permeability	0.94
8663:							
Clareson------------	60	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Slope	1.00
		Slope	0.04	Slope	0.04	Restricted permeability	0.94
						Depth to bedrock	0.20
Rock outcrop--------	20	Not rated		Not rated		Not rated	
8789:							
Lebo----------------	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Gravel content	0.16	Gravel content	0.16	Gravel content	1.00
						Depth to bedrock	0.01
8911:							
Summit--------------	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Restricted permeability	0.94
		Depth to saturated zone	0.39	Depth to saturated zone	0.19	Depth to saturated zone	0.39
						Slope	0.12

Table 11a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Value	Picnic areas: Rating class and limiting features	Value	Playgrounds: Rating class and limiting features	Value
8912:							
Summit--------------	85	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Slope	1.00
		Depth to saturated zone	0.39	Depth to saturated zone	0.19	Restricted permeability	0.94
						Depth to saturated zone	0.39
8953:							
Wagstaff------------	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Restricted permeability	0.94
8955:							
Wagstaff------------	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Restricted permeability	0.94
						Slope	0.88
						Depth to bedrock	0.20
8957:							
Wagstaff------------	45	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Slope	1.00
						Restricted permeability	0.94
						Depth to bedrock	0.20
Summit--------------	35	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.94	Restricted permeability	0.94	Slope	1.00
		Depth to saturated zone	0.39	Depth to saturated zone	0.19	Restricted permeability	0.94
						Depth to saturated zone	0.39
8962:							
Woodson-------------	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Restricted permeability	1.00	Depth to saturated zone	1.00
		Restricted permeability	1.00	Depth to saturated zone	0.96	Restricted permeability	1.00
9967:							
Arents, landfill----	100	Not rated		Not rated		Not rated	
9971:							
Arents, earthen dam-	100	Not rated		Not rated		Not rated	
9982:							
Fluvents------------	100	Not rated		Not rated		Not rated	
9983:							
Pits, quarries------	100	Not rated		Not rated		Not rated	
9984:							
Made land-----------	100	Not rated		Not rated		Not rated	
9986:							
Miscellaneous water-	100	Not rated		Not rated		Not rated	

Table 11a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9991:							
Orthents------------	100	Not rated		Not rated		Not rated	
9993:							
Pits----------------	100	Not rated		Not rated		Not rated	
9999:							
Water---------------	100	Not rated		Not rated		Not rated	

Table 11b.--Recreation

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4015:							
Chase---------------	90	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
						Depth to saturated zone	0.19
4752:							
Sogn----------------	55	Not limited		Not limited		Very limited	
						Depth to bedrock	1.00
						Droughty	0.80
						Slope	0.16
Vinland-------------	30	Not limited		Not limited		Very limited	
						Depth to bedrock	1.00
						Slope	0.84
						Droughty	0.17
7031:							
Eudora--------------	85	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
7035:							
Eudora--------------	55	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
Bismarckgrove-------	25	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
7036:							
Eudora--------------	50	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
Bismarckgrove-------	25	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
7050:							
Kennebec------------	85	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
7051:							
Kennebec------------	85	Somewhat limited		Somewhat limited		Very limited	
		Flooding	0.40	Flooding	0.40	Flooding	1.00
7055:							
Kimo----------------	85	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
						Depth to saturated zone	0.19
7089:							
Stonehouse----------	50	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
						Droughty	0.29
Eudora--------------	30	Not limited		Not limited		Somewhat limited	
						Flooding	0.60

Table 11b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
7090:							
Wabash	91	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
						Flooding	0.60
7105:							
Belvue	85	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
7106:							
Eudora	55	Not limited		Not limited		Not limited	
Bismarckgrove	30	Not limited		Not limited		Not limited	
7123:							
Eudora	85	Not limited		Not limited		Not limited	
7155:							
Kimo	85	Not limited		Not limited		Somewhat limited	
						Depth to saturated zone	0.19
7170:							
Reading	90	Not limited		Not limited		Not limited	
7251:							
Grundy	100	Somewhat limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.92	Depth to saturated zone	0.92	Depth to saturated zone	0.96
7261:							
Gymer	88	Not limited		Not limited		Not limited	
7285:							
Ladoga	90	Not limited		Not limited		Not limited	
7286:							
Ladoga	85	Not limited		Not limited		Somewhat limited	
						Slope	0.63
7302:							
Martin	90	Not limited		Not limited		Somewhat limited	
						Depth to saturated zone	0.19
7330:							
Martin	45	Very limited		Very limited		Somewhat limited	
		Water erosion	1.00	Water erosion	1.00	Depth to saturated zone	0.19
						Slope	0.04
Vinland	40	Not limited		Not limited		Very limited	
						Depth to bedrock	1.00
						Slope	0.63
						Droughty	0.07
7433:							
Morrill	85	Not limited		Not limited		Not limited	

Table 11b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
7460:							
Oska----------------	88	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.01
7462:							
Oska----------------	50	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.29
Martin--------------	30	Not limited		Not limited		Somewhat limited	
						Depth to saturated zone	0.19
7502:							
Pawnee--------------	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.92	Depth to saturated zone	0.92	Depth to saturated zone	0.96
7525:							
Chillicothe---------	85	Not limited		Not limited		Not limited	
7535:							
Sharpsburg----------	85	Not limited		Not limited		Not limited	
7545:							
Sharpsburg----------	55	Not limited		Not limited		Not limited	
Urban land----------	45	Not rated		Not rated		Not rated	
7603:							
Sibleyville---------	85	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.71
7607:							
Sibleyville---------	45	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.54
Vinland-------------	35	Not limited		Not limited		Very limited	
						Depth to bedrock	1.00
						Droughty	0.01
7658:							
Vinland-------------	60	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to bedrock	1.00
						Slope	1.00
						Droughty	0.07
Rock outcrop--------	20	Not rated		Not rated		Not rated	
7805:							
Arisburg------------	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.44	Depth to saturated zone	0.44	Depth to saturated zone	0.75
8101:							
Hepler--------------	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.92	Depth to saturated zone	0.92	Depth to saturated zone	0.96
						Flooding	0.60

Table 11b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
8301:							
Verdigris	85	Somewhat limited		Somewhat limited		Very limited	
		Flooding	0.40	Flooding	0.40	Flooding	1.00
8302:							
Verdigris	90	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
8390:							
Wynona	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.92	Depth to saturated zone	0.92	Depth to saturated zone	0.96
						Flooding	0.60
8501:							
Mason	85	Not limited		Not limited		Not limited	
8640:							
Bucyrus	85	Not limited		Not limited		Not limited	
8641:							
Bucyrus	85	Not limited		Not limited		Not limited	
8663:							
Clareson	60	Not limited		Not limited		Somewhat limited	
						Droughty	0.86
						Depth to bedrock	0.20
						Content of large stones	0.11
Rock outcrop	20	Not rated		Not rated		Not rated	
8789:							
Lebo	85	Somewhat limited		Not limited		Very limited	
		Slope	0.92			Slope	1.00
						Gravel content	0.16
						Depth to bedrock	0.01
8911:							
Summit	85	Not limited		Not limited		Somewhat limited	
						Depth to saturated zone	0.19
8912:							
Summit	85	Not limited		Not limited		Somewhat limited	
						Depth to saturated zone	0.19
8953:							
Wagstaff	85	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.20
8955:							
Wagstaff	85	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.20

Table 11b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
8957:							
Wagstaff------------	45	Not limited		Not limited		Somewhat limited	
						Depth to bedrock	0.20
Summit--------------	35	Not limited		Not limited		Somewhat limited	
						Depth to saturated zone	0.19
8962:							
Woodson-------------	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.92	Depth to saturated zone	0.92	Depth to saturated zone	0.96
9971:							
Arents, earthen dam-	100	Not rated		Not rated		Not rated	
9982:							
Fluvents------------	100	Not rated		Not rated		Not rated	
9983:							
Pits, quarries------	100	Not rated		Not rated		Not rated	
9984:							
Made land-----------	100	Not rated		Not rated		Not rated	
9986:							
Miscellaneous water-	100	Not rated		Not rated		Not rated	
9991:							
Orthents------------	100	Not rated		Not rated		Not rated	
9993:							
Pits----------------	100	Not rated		Not rated		Not rated	
9999:							
Water---------------	100	Not rated		Not rated		Not rated	

Table 12.--Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
4015:												
Chase	Good	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Fair	---
4752:												
Sogn	Very poor	Very poor	Poor	---	---	Poor	Very poor	Very poor	Very poor	---	Very poor	Poor
Vinland	Poor	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor	Fair
7031:												
Eudora	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor	---
7035:												
Eudora	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor	Good
Bismarckgrove	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Poor	---
7036:												
Eudora	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor	Good
Bismarckgrove	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Poor	---
7050:												
Kennebec	Good	Good	Good	Good	Good	---	Poor	Very poor	Good	Good	Very poor	---
7051:												
Kennebec	Good	Good	Good	Good	Good	---	Poor	Very poor	Good	Good	Very poor	---
7055:												
Kimo	Good	Good	Good	Fair	Fair	Fair	Good	Good	Good	Fair	Good	---
7089:												
Stonehouse	Poor	Poor	Fair	Poor	Poor	---	Very poor	Very poor	Poor	Poor	Very poor	---
Eudora	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor	---
7090:												
Wabash	Poor	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good	---
7105:												
Belvue	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor	---
7106:												
Eudora	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor	---
Bismarckgrove	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Poor	---
7123:												
Eudora	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor	---
7155:												
Kimo	Good	Good	Good	Fair	Fair	Fair	Good	Good	Good	Fair	Good	---
7170:												
Reading	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor	---

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
7251:												
Grundy	Fair	Good	Fair	Good	Good	---	Fair	Fair	Fair	Good	Fair	---
7261:												
Gymer	Fair	Good	Fair	Good	Good	Good	Poor	Very poor	Fair	---	Very poor	Fair
7285:												
Ladoga	Fair	Good	Fair	Good	Good	---	Very poor	Poor	Fair	Good	Very poor	---
7286:												
Ladoga	Fair	Good	Fair	Good	Good	---	Very poor	Poor	Fair	Good	Very poor	---
7302:												
Martin	Good	Good	Good	Fair	Fair	Good	Poor	Poor	Good	Fair	Poor	Good
7330:												
Martin	Fair	Good	Good	Fair	Fair	Good	Poor	Very poor	Good	Fair	Very poor	Good
Vinland	Poor	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor	Fair
7433:												
Morrill	Fair	Good	Good	Fair	Fair	Good	Very poor	Very poor	Good	Fair	Very poor	Good
7460:												
Oska	Fair	Good	Good	---	---	Good	Poor	Poor	Fair	---	Poor	Good
7462:												
Oska	Fair	Good	Good	---	---	Good	Poor	Poor	Fair	---	Poor	Good
Martin	Fair	Good	Good	Fair	Fair	Good	Poor	Very poor	Good	Fair	Very poor	Good
7502:												
Pawnee	Fair	Good	Good	---	Fair	Fair	Very poor	Poor	Good	---	Poor	Fair
7525:												
Chillicothe	Good	Good	Good	Good	Good	---	Poor	Very poor	Good	Good	Very poor	---
7535:												
Sharpsburg	Fair	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor	---
7545:												
Sharpsburg	Fair	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor	---
Urban land.												
7603:												
Sibleyville	Fair	Good	Good	Fair	Fair	Good	Poor	Very poor	Good	Fair	Very poor	Good

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
7607:												
Sibleyville	Fair	Good	Good	Fair	Fair	Good	Poor	Very poor	Good	Fair	Very poor	Good
Vinland	Poor	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor	Fair
7658:												
Vinland	Poor	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor	Fair
Rock outcrop	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
7805:												
Arisburg	Fair	Good	Good	Good	Good	---	Poor	Very poor	Good	Good	Very poor	---
8101:												
Hepler	Fair	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Fair	Good
8301:												
Verdigris	Good	Good	Good	Good	Good	Good	Poor	Fair	Good	Good	Poor	Good
8302:												
Verdigris	Good	Good	Good	Good	Good	Good	Poor	Fair	Good	Good	Poor	Good
8390:												
Wynona	Good	Good	Good	Good	Good	---	Fair	Fair	Good	Good	Good	---
8501:												
Mason	Good	Good	Good	Good	Good	---	Poor	Very poor	Good	Good	Very poor	---
8640:												
Bucyrus	Good	Good	Good	Good	Good	---	Poor	Very poor	Good	Good	Very poor	---
8641:												
Bucyrus	Good	Good	Good	Good	Good	---	Poor	Very poor	Good	Good	Very poor	---
8663:												
Clareson	Fair	Good	Good	Fair	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor	Fair
Rock outcrop	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
8789:												
Lebo	Poor	Poor	Good	Good	Good	---	Very poor	Very poor	Fair	Good	Very poor	---
8911:												
Summit	Good	Good	Fair	Good	Good	Poor	Poor	Poor	Good	Good	Poor	Good
8912:												
Summit	Good	Good	Fair	Good	Good	---	Poor	Poor	Good	Good	Poor	---
8953:												
Wagstaff	Good	Good	Fair	Good	---	---	Poor	Poor	Good	Good	Poor	---

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
8955:												
Wagstaff	Good	Good	Fair	Good	Good	---	Poor	Poor	Good	Good	Poor	---
8957:												
Wagstaff	Good	Good	Fair	Good	Good	---	Poor	Poor	Good	Good	Poor	---
Summit	Good	Good	Fair	Good	Good	---	Poor	Poor	Good	Good	Poor	---
8962:												
Woodson	Fair	Good	Fair	Poor	Poor	Fair	Poor	Good	Fair	Fair	Fair	Fair
9967.												
Arents, landfill												
9971.												
Arents, earthen dam												
9982.												
Fluvents												
9983.												
Pits, quarries												
9984.												
Made land												
9986.												
Miscellaneous water												
9991.												
Orthents												
9993.												
Pits												
9999.												
Water												

Table 13a.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4015:							
Chase	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	1.00	Depth to saturated zone	1.00	Shrink-swell	1.00
		Depth to saturated zone	0.39	Shrink-swell	1.00	Depth to saturated zone	0.39
4752:							
Sogn	55	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
		Slope	0.16	Slope	0.16	Shrink-swell	0.50
Vinland	30	Somewhat limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.84	Slope	0.84	Slope	1.00
		Shrink-swell	0.73	Shrink-swell	0.73	Shrink-swell	0.73
7031:							
Eudora	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
7035:							
Eudora	55	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Bismarckgrove	25	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.11			Shrink-swell	0.11
7036:							
Eudora	50	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Bismarckgrove	25	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.11			Shrink-swell	0.11
7050:							
Kennebec	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.11	Depth to saturated zone	0.82	Shrink-swell	0.11
				Shrink-swell	0.11		
7051:							
Kennebec	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.11	Depth to saturated zone	0.82	Shrink-swell	0.11
				Shrink-swell	0.11		

Table 13a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
7055:							
Kimo----------------	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.39	Depth to saturated zone	1.00	Depth to saturated zone	0.39
7089:							
Stonehouse----------	50	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Eudora--------------	30	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
7090:							
Wabash--------------	91	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
7105:							
Belvue--------------	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
						Slope	1.00
7106:							
Eudora--------------	55	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Bismarckgrove-------	30	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.11			Shrink-swell	0.11
7123:							
Eudora--------------	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
7155:							
Kimo----------------	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.39	Depth to saturated zone	1.00	Depth to saturated zone	0.39
7170:							
Reading-------------	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.92	Shrink-swell	0.92	Shrink-swell	0.92
7251:							
Grundy--------------	100	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	0.99	Shrink-swell	1.00
7261:							
Gymer---------------	88	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
						Slope	0.50

Table 13a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
7285:							
Ladoga--------------	90	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	0.92	Shrink-swell	1.00
				Depth to saturated zone	0.61	Slope	0.50
7286:							
Ladoga--------------	85	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	0.92	Slope	1.00
		Slope	0.63	Slope	0.63	Shrink-swell	1.00
				Depth to saturated zone	0.61		
7302:							
Martin--------------	90	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Shrink-swell	1.00
		Depth to saturated zone	0.39	Shrink-swell	1.00	Depth to saturated zone	0.39
7330:							
Martin--------------	45	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Shrink-swell	1.00
		Depth to saturated zone	0.39	Shrink-swell	1.00	Slope	1.00
		Slope	0.04	Slope	0.04	Depth to saturated zone	0.39
Vinland-------------	40	Somewhat limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Shrink-swell	0.82	Shrink-swell	0.82	Depth to soft bedrock	1.00
		Slope	0.63	Slope	0.63	Shrink-swell	0.82
7433:							
Morrill-------------	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.62	Shrink-swell	0.62	Shrink-swell	0.62
						Slope	0.50
7460:							
Oska----------------	88	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
		Depth to hard bedrock	0.01	Depth to hard bedrock	1.00	Slope	0.12
						Depth to hard bedrock	0.01
7462:							
Oska----------------	50	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
		Depth to hard bedrock	0.29	Depth to hard bedrock	1.00	Slope	0.50
						Depth to hard bedrock	0.29
Martin--------------	30	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Shrink-swell	1.00
		Depth to saturated zone	0.39	Shrink-swell	1.00	Slope	0.50
						Depth to saturated zone	0.39

Table 13a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
7502:							
Pawnee	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
						Slope	0.12
7525:							
Chillicothe	85	Somewhat limited		Very limited		Somewhat limited	
		Shrink-swell	0.73	Depth to saturated zone	0.99	Shrink-swell	0.73
				Shrink-swell	0.73		
7535:							
Sharpsburg	85	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.91	Slope	0.50
7545:							
Sharpsburg	55	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.91	Slope	0.50
Urban land	45	Not rated		Not rated		Not rated	
7603:							
Sibleyville	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.01	Depth to soft bedrock	0.71	Slope	0.12
						Shrink-swell	0.01
7607:							
Sibleyville	45	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.62	Shrink-swell	0.62	Shrink-swell	0.62
				Depth to soft bedrock	0.54	Slope	0.12
Vinland	35	Somewhat limited		Very limited		Somewhat limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
		Shrink-swell	0.82	Shrink-swell	0.82	Shrink-swell	0.82
						Slope	0.12
7658:							
Vinland	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
		Shrink-swell	0.82	Shrink-swell	0.82	Shrink-swell	0.82
Rock outcrop	20	Not rated		Not rated		Not rated	
7805:							
Arisburg	85	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Shrink-swell	1.00
		Depth to saturated zone	0.98	Shrink-swell	1.00	Depth to saturated zone	0.98

Table 13a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
8101:							
Hepler	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
				Shrink-swell	0.99		
8301:							
Verdigris	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.02	Shrink-swell	0.11	Shrink-swell	0.02
8302:							
Verdigris	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.02	Shrink-swell	0.11	Shrink-swell	0.02
8390:							
Wynona	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.73	Shrink-swell	0.73	Shrink-swell	0.73
8501:							
Mason	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.62	Shrink-swell	0.62	Shrink-swell	0.62
8640:							
Bucyrus	85	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
8641:							
Bucyrus	85	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
						Slope	0.50
8663:							
Clareson	60	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to hard bedrock	1.00	Shrink-swell	1.00
		Depth to hard bedrock	0.20	Shrink-swell	1.00	Slope	1.00
		Slope	0.04	Slope	0.04	Depth to hard bedrock	0.20
Rock outcrop	20	Not rated		Not rated		Not rated	
8789:							
Lebo	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.62	Shrink-swell	0.62	Shrink-swell	0.62
				Depth to soft bedrock	0.01		
8911:							
Summit	85	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Shrink-swell	1.00
		Depth to saturated zone	0.39	Shrink-swell	1.00	Depth to saturated zone	0.39

Table 13a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
8912:							
Summit	85	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Shrink-swell	1.00
		Depth to saturated zone	0.39	Shrink-swell	1.00	Slope	0.50
						Depth to saturated zone	0.39
8953:							
Wagstaff	85	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
		Depth to hard bedrock	0.20	Depth to hard bedrock	1.00	Depth to hard bedrock	0.20
8955:							
Wagstaff	85	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
		Depth to hard bedrock	0.20	Depth to hard bedrock	1.00	Depth to hard bedrock	0.20
						Slope	0.12
8957:							
Wagstaff	45	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
		Depth to hard bedrock	0.20	Depth to hard bedrock	1.00	Slope	0.50
						Depth to hard bedrock	0.20
Summit	35	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Shrink-swell	1.00
		Depth to saturated zone	0.39	Shrink-swell	1.00	Slope	0.50
						Depth to saturated zone	0.39
8962:							
Woodson	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
9967:							
Arents, landfill	100	Not rated		Not rated		Not rated	
9971:							
Arents, earthen dam	100	Not rated		Not rated		Not rated	
9982:							
Fluvents	100	Not rated		Not rated		Not rated	
9983:							
Pits, quarries	100	Not rated		Not rated		Not rated	
9984:							
Made land	100	Not rated		Not rated		Not rated	
9986:							
Miscellaneous water	100	Not rated		Not rated		Not rated	

Table 13a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9991:							
Orthents------------	100	Not rated		Not rated		Not rated	
9993:							
Pits----------------	100	Not rated		Not rated		Not rated	
9999:							
Water---------------	100	Not rated		Not rated		Not rated	

Table 13b.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4015:							
Chase	90	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Flooding	0.60
		Frost action	1.00	Flooding	0.60	Depth to saturated zone	0.19
		Flooding	1.00	Too clayey	0.12		
4752:							
Sogn	55	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to bedrock	1.00
		Low strength	1.00	Slope	0.16	Droughty	0.80
		Shrink-swell	0.50	Cutbanks cave	0.10	Slope	0.16
Vinland	30	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Low strength	1.00	Slope	0.84	Slope	0.84
		Slope	0.84	Cutbanks cave	0.10	Droughty	0.17
7031:							
Eudora	85	Very limited		Somewhat limited		Somewhat limited	
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		
7035:							
Eudora	55	Very limited		Somewhat limited		Somewhat limited	
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		
Bismarckgrove	25	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Cutbanks cave	1.00	Flooding	0.60
		Flooding	1.00	Flooding	0.60		
		Low strength	1.00				
7036:							
Eudora	50	Very limited		Somewhat limited		Somewhat limited	
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		
Bismarckgrove	25	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Cutbanks cave	1.00	Flooding	0.60
		Flooding	1.00	Flooding	0.60		
		Low strength	1.00				
7050:							
Kennebec	85	Very limited		Somewhat limited		Somewhat limited	
		Frost action	1.00	Depth to saturated zone	0.82	Flooding	0.60
		Flooding	1.00	Flooding	0.60		
		Low strength	1.00	Cutbanks cave	0.10		

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
7051:							
Kennebec	85	Very limited		Somewhat limited		Very limited	
		Frost action	1.00	Depth to saturated zone	0.82	Flooding	1.00
		Flooding	1.00	Flooding	0.80		
		Low strength	1.00	Cutbanks cave	0.10		
7055:							
Kimo	85	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Depth to saturated zone	1.00	Flooding	0.60
		Flooding	1.00	Flooding	0.60	Depth to saturated zone	0.19
		Depth to saturated zone	0.19	Cutbanks cave	0.10		
7089:							
Stonehouse	50	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	0.60
				Flooding	0.60	Droughty	0.29
Eudora	30	Very limited		Somewhat limited		Somewhat limited	
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		
7090:							
Wabash	91	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Too clayey	0.50		
7105:							
Belvue	85	Very limited		Somewhat limited		Somewhat limited	
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		
7106:							
Eudora	55	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Cutbanks cave	0.10		
		Flooding	0.40				
Bismarckgrove	30	Very limited		Very limited		Not limited	
		Frost action	1.00	Cutbanks cave	1.00		
		Low strength	1.00				
		Flooding	0.40				
7123:							
Eudora	85	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Cutbanks cave	0.10		
		Flooding	0.40				
7155:							
Kimo	85	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.19
		Flooding	0.40	Cutbanks cave	0.10		
		Depth to saturated zone	0.19				

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
7170:							
Reading	90	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00	Too clayey	0.02		
		Shrink-swell	0.92				
7251:							
Grundy	100	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.96
		Frost action	1.00	Too clayey	0.12		
		Low strength	1.00	Cutbanks cave	0.10		
7261:							
Gymer	88	Very limited		Somewhat limited		Not limited	
		Shrink-swell	1.00	Cutbanks cave	0.10		
		Low strength	1.00				
		Frost action	0.50				
7285:							
Ladoga	90	Very limited		Somewhat limited		Not limited	
		Shrink-swell	1.00	Depth to saturated zone	0.61		
		Low strength	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
7286:							
Ladoga	85	Very limited		Somewhat limited		Somewhat limited	
		Shrink-swell	1.00	Slope	0.63	Slope	0.63
		Low strength	1.00	Depth to saturated zone	0.61		
		Slope	0.63	Cutbanks cave	0.10		
7302:							
Martin	90	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.19
		Frost action	1.00	Too clayey	0.32		
		Low strength	1.00	Cutbanks cave	0.10		
7330:							
Martin	45	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.19
		Frost action	1.00	Too clayey	0.32	Slope	0.04
		Low strength	1.00	Cutbanks cave	0.10		
Vinland	40	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Low strength	1.00	Slope	0.63	Slope	0.63
		Shrink-swell	0.82	Cutbanks cave	0.10	Droughty	0.07
7433:							
Morrill	85	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.62				
		Frost action	0.50				

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
7460:							
Oska----------------	88	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to hard bedrock	1.00	Depth to bedrock	0.01
		Low strength	1.00				
		Frost action	0.50	Too clayey	0.32		
				Cutbanks cave	0.10		
7462:							
Oska----------------	50	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to hard bedrock	1.00	Depth to bedrock	0.29
		Low strength	1.00				
		Frost action	0.50	Too clayey	0.12		
				Cutbanks cave	0.10		
Martin--------------	30	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.19
		Frost action	1.00				
		Low strength	1.00	Too clayey	0.32		
				Cutbanks cave	0.10		
7502:							
Pawnee--------------	85	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.96
		Frost action	1.00				
		Low strength	1.00	Too clayey	0.12		
				Cutbanks cave	0.10		
7525:							
Chillicothe---------	85	Very limited		Very limited		Not limited	
		Low strength	1.00	Depth to saturated zone	0.99		
		Shrink-swell	0.73				
		Frost action	0.50	Too clayey	0.50		
				Cutbanks cave	0.10		
7535:							
Sharpsburg----------	85	Very limited		Somewhat limited		Not limited	
		Shrink-swell	1.00	Depth to saturated zone	0.91		
		Frost action	1.00				
		Low strength	1.00	Cutbanks cave	0.10		
7545:							
Sharpsburg----------	55	Very limited		Somewhat limited		Not limited	
		Shrink-swell	1.00	Depth to saturated zone	0.91		
		Frost action	1.00				
		Low strength	1.00	Cutbanks cave	0.10		
Urban land----------	45	Not rated		Not rated		Not rated	
7603:							
Sibleyville---------	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.71	Depth to bedrock	0.71
		Shrink-swell	0.01				
				Cutbanks cave	0.10		

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
7607:							
Sibleyville	45	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Depth to soft bedrock	0.54	Depth to bedrock	0.54
		Shrink-swell	0.62				
		Frost action	0.50	Cutbanks cave	0.10		
Vinland	35	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
						Droughty	0.01
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.82				
7658:							
Vinland	60	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Depth to soft bedrock	1.00			Slope	1.00
				Slope	1.00	Droughty	0.07
		Low strength	1.00	Cutbanks cave	0.10		
Rock outcrop	20	Not rated		Not rated		Not rated	
7805:							
Arisburg	85	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.75
		Frost action	1.00				
		Low strength	1.00	Too clayey	0.12		
				Cutbanks cave	0.10		
8101:							
Hepler	90	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.96
		Low strength	1.00				
		Depth to saturated zone	0.96	Flooding	0.60	Flooding	0.60
				Cutbanks cave	0.10		
8301:							
Verdigris	85	Very limited		Somewhat limited		Very limited	
		Flooding	1.00	Flooding	0.80	Flooding	1.00
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.02				
8302:							
Verdigris	90	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.02				
8390:							
Wynona	85	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.96
		Low strength	1.00				
		Depth to saturated zone	0.96	Flooding	0.60	Flooding	0.60
				Cutbanks cave	0.10		
8501:							
Mason	85	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.62				
		Flooding	0.40				

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
8640:							
Bucyrus	85	Very limited		Somewhat limited		Not limited	
		Shrink-swell	1.00	Too clayey	0.76		
		Low strength	1.00	Cutbanks cave	0.10		
8641:							
Bucyrus	85	Very limited		Somewhat limited		Not limited	
		Shrink-swell	1.00	Too clayey	0.76		
		Low strength	1.00	Cutbanks cave	0.10		
8663:							
Clareson	60	Very limited		Very limited		Somewhat limited	
		Low strength	1.00	Depth to hard bedrock	1.00	Droughty	0.86
		Shrink-swell	1.00			Depth to bedrock	0.20
		Depth to hard bedrock	0.20	Cutbanks cave	0.10	Content of large stones	0.11
				Slope	0.04		
Rock outcrop	20	Not rated		Not rated		Not rated	
8789:							
Lebo	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.62	Cutbanks cave	0.10	Gravel content	0.16
				Depth to soft bedrock	0.01	Depth to bedrock	0.01
8911:							
Summit	85	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.19
		Low strength	1.00				
		Depth to saturated zone	0.19	Too clayey	0.68		
				Cutbanks cave	0.10		
8912:							
Summit	85	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.19
		Low strength	1.00				
		Depth to saturated zone	0.19	Too clayey	0.68		
				Cutbanks cave	0.10		
8953:							
Wagstaff	85	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to hard bedrock	1.00	Depth to bedrock	0.20
		Low strength	1.00				
		Depth to hard bedrock	0.20	Too clayey	0.88		
				Cutbanks cave	0.10		
8955:							
Wagstaff	85	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to hard bedrock	1.00	Depth to bedrock	0.20
		Low strength	1.00				
		Depth to hard bedrock	0.20	Too clayey	0.88		
				Cutbanks cave	0.10		

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
8957:							
Wagstaff------------	45	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to hard bedrock	1.00	Depth to bedrock	0.20
		Low strength	1.00	Too clayey	0.88		
		Depth to hard bedrock	0.20	Cutbanks cave	0.10		
Summit--------------	35	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.19
		Low strength	1.00	Too clayey	0.68		
		Depth to saturated zone	0.19	Cutbanks cave	0.10		
8962:							
Woodson-------------	85	Very limited		Very limited		Somewhat limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.96
		Low strength	1.00	Too clayey	0.50		
		Depth to saturated zone	0.96	Cutbanks cave	0.10		
9967:							
Arents, landfill----	100	Not rated		Not rated		Not rated	
9971:							
Arents, earthen dam-	100	Not rated		Not rated		Not rated	
9982:							
Fluvents------------	100	Not rated		Not rated		Not rated	
9983:							
Pits, quarries------	100	Not rated		Not rated		Not rated	
9984:							
Made land-----------	100	Not rated		Not rated		Not rated	
9986:							
Miscellaneous water-	100	Not rated		Not rated		Not rated	
9991:							
Orthents------------	100	Not rated		Not rated		Not rated	
9993:							
Pits----------------	100	Not rated		Not rated		Not rated	
9999:							
Water---------------	100	Not rated		Not rated		Not rated	

Table 14a.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
4015:					
Chase	90	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	1.00	Depth to saturated zone	0.75
		Depth to saturated zone	1.00		
4752:					
Sogn	55	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	0.16	Slope	1.00
				Seepage	0.50
Vinland	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.84		
				Slope	1.00
				Seepage	0.50
7031:					
Eudora	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.82	Seepage	0.18
Bismarckgrove	10	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.98	Seepage	0.32
7035:					
Eudora	55	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.82	Seepage	0.18
Bismarckgrove	25	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.98	Seepage	0.32
7036:					
Eudora	50	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.82	Seepage	0.18
Bismarckgrove	25	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.98	Seepage	0.32

Table 14a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
7050:					
Kennebec	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	0.99
		Restricted permeability	0.98	Seepage	0.02
7051:					
Kennebec	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	0.99
		Restricted permeability	0.98	Seepage	0.02
7055:					
Kimo	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.18
7089:					
Stonehouse	50	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Seepage (bottom layer)	1.00	Seepage	1.00
Eudora	30	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.82	Seepage	0.18
7090:					
Wabash	91	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00		
7105:					
Belvue	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.82	Slope	1.00
				Seepage	0.32
7106:					
Eudora	55	Somewhat limited		Somewhat limited	
		Restricted permeability	0.82	Flooding	0.40
		Flooding	0.40	Seepage	0.18
Bismarckgrove	30	Somewhat limited		Somewhat limited	
		Restricted permeability	0.98	Flooding	0.40
		Flooding	0.40	Seepage	0.32

Table 14a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
7123:					
Eudora	85	Somewhat limited		Somewhat limited	
		Restricted permeability	0.82	Flooding	0.40
		Flooding	0.40	Seepage	0.18
7155:					
Kimo	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Flooding	0.40
		Flooding	0.40	Seepage	0.18
7170:					
Reading	90	Somewhat limited		Somewhat limited	
		Restricted permeability	0.68	Seepage	0.50
		Flooding	0.40	Flooding	0.40
7251:					
Grundy	100	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00		
7261:					
Gymer	88	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.92
				Seepage	0.50
7285:					
Ladoga	90	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.92
		Depth to saturated zone	0.99	Seepage	0.50
7286:					
Ladoga	85	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Depth to saturated zone	0.99	Seepage	0.50
		Slope	0.63		
7302:					
Martin	90	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.75
		Depth to saturated zone	1.00	Slope	0.32

Table 14a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
7330:					
Martin	45	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	0.75
		Slope	0.04		
Vinland	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63	Slope	1.00
				Seepage	0.50
7433:					
Morrill	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.92
				Seepage	0.50
7460:					
Oska	88	Very limited		Very limited	
		Restricted permeability	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	0.68
7462:					
Oska	50	Very limited		Very limited	
		Restricted permeability	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	0.92
Martin	30	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.92
		Depth to saturated zone	1.00	Depth to saturated zone	0.75
7502:					
Pawnee	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	0.68
7525:					
Chillicothe	85	Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Seepage	0.50
		Restricted permeability	0.50	Slope	0.32
				Depth to saturated zone	0.19
7535:					
Sharpsburg	85	Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Slope	0.92
		Restricted permeability	1.00	Seepage	0.50

Table 14a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
7545:					
Sharpsburg----------	55	Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Slope	0.92
		Restricted permeability	1.00	Seepage	0.50
Urban land----------	45	Not rated		Not rated	
7603:					
Sibleyville---------	85	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	0.50	Slope	0.68
				Seepage	0.50
7607:					
Sibleyville---------	45	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	0.50	Slope	0.68
				Seepage	0.50
Vinland-------------	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
				Slope	0.68
				Seepage	0.50
7658:					
Vinland-------------	60	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.50
Rock outcrop--------	20	Not rated		Not rated	
7805:					
Arisburg------------	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	0.99
		Restricted permeability	1.00		
8101:					
Hepler--------------	90	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Restricted permeability	1.00	Seepage	0.50
8301:					
Verdigris-----------	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.50	Seepage	0.50

Table 14a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
8302:					
Verdigris	90	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.50	Seepage	0.50
8390:					
Wynona	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.50
8501:					
Mason	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Seepage	0.50
		Flooding	0.40	Flooding	0.40
8640:					
Bucyrus	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Seepage	0.50
		Depth to bedrock	0.01		
8641:					
Bucyrus	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.92
		Depth to bedrock	0.01		
8663:					
Clareson	60	Very limited		Very limited	
		Restricted permeability	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slope	0.04	Seepage	0.32
Rock outcrop	20	Not rated		Not rated	
8789:					
Lebo	85	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	0.50
8911:					
Summit	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.75
		Depth to saturated zone	1.00	Slope	0.08
8912:					
Summit	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.92
		Depth to saturated zone	1.00	Depth to saturated zone	0.75

Table 14a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
8953:					
Wagstaff------------	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00		
8955:					
Wagstaff------------	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	0.68
8957:					
Wagstaff------------	45	Very limited		Very limited	
		Restricted permeability	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	0.92
Summit--------------	35	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.92
		Depth to saturated zone	1.00	Depth to saturated zone	0.75
8962:					
Woodson-------------	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00		
9967:					
Arents, landfill----	100	Not rated		Not rated	
9971:					
Arents, earthen dam-	100	Not rated		Not rated	
9982:					
Fluvents------------	100	Not rated		Not rated	
9983:					
Pits, quarries------	100	Not rated		Not rated	
9984:					
Made land-----------	100	Not rated		Not rated	
9986:					
Miscellaneous water-	100	Not rated		Not rated	
9991:					
Orthents------------	100	Not rated		Not rated	
9993:					
Pits----------------	100	Not rated		Not rated	
9999:					
Water---------------	100	Not rated		Not rated	

Table 14b.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
4015:							
Chase	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too clayey	1.00
		Too clayey	1.00	Depth to saturated zone	0.75	Hard to compact	1.00
		Depth to saturated zone	0.99			Depth to saturated zone	0.86
4752:							
Sogn	55	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	0.50	Slope	0.16	Too clayey	0.50
		Slope	0.16			Slope	0.16
Vinland	30	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.84	Slope	0.84	Slope	0.84
		Too clayey	0.50			Too clayey	0.50
7031:							
Eudora	85	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
7035:							
Eudora	55	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
Bismarckgrove	25	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Too sandy	0.50
		Too sandy	0.50				
7036:							
Eudora	50	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
Bismarckgrove	25	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Too sandy	0.50
		Too sandy	0.50				
7050:							
Kennebec	85	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		
7051:							
Kennebec	85	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		
7055:							
Kimo	85	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	0.86
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		

Table 14b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7089:							
Stonehouse	50	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Seepage	0.50
		Seepage (bottom layer)	1.00	Seepage	1.00		
Eudora	30	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
7090:							
Wabash	91	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00			Hard to compact	1.00
7105:							
Belvue	85	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
7106:							
Eudora	55	Somewhat limited		Somewhat limited		Not limited	
		Flooding	0.40	Flooding	0.40		
Bismarckgrove	30	Somewhat limited		Somewhat limited		Somewhat limited	
		Too sandy	0.50	Flooding	0.40	Too sandy	0.50
		Flooding	0.40				
7123:							
Eudora	85	Somewhat limited		Somewhat limited		Not limited	
		Flooding	0.40	Flooding	0.40		
7155:							
Kimo	85	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.86
		Flooding	0.40	Flooding	0.40		
7170:							
Reading	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Too clayey	0.50	Flooding	0.40	Too clayey	0.50
		Flooding	0.40				
7251:							
Grundy	100	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Too clayey	0.50
7261:							
Gymer	88	Somewhat limited		Not limited		Somewhat limited	
		Too clayey	0.50			Too clayey	0.50
7285:							
Ladoga	90	Somewhat limited		Not limited		Somewhat limited	
		Too clayey	0.50			Too clayey	0.50
7286:							
Ladoga	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50

Table 14b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
7302:							
Martin	90	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Depth to saturated zone	0.75	Too clayey	1.00
		Depth to saturated zone	0.99			Hard to compact	1.00
						Depth to saturated zone	0.86
7330:							
Martin	45	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Depth to saturated zone	0.75	Too clayey	1.00
		Depth to saturated zone	0.99	Slope	0.04	Hard to compact	1.00
		Slope	0.04			Depth to saturated zone	0.86
Vinland	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
7433:							
Morrill	85	Somewhat limited		Not limited		Somewhat limited	
		Too clayey	0.50			Too clayey	0.50
7460:							
Oska	88	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
7462:							
Oska	50	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
Martin	30	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Depth to saturated zone	0.75	Too clayey	1.00
		Depth to saturated zone	0.99			Hard to compact	1.00
						Depth to saturated zone	0.86
7502:							
Pawnee	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
7525:							
Chillicothe	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.86	Depth to saturated zone	0.19	Too clayey	0.50
		Too clayey	0.50			Depth to saturated zone	0.47
7535:							
Sharpsburg	85	Somewhat limited		Not limited		Very limited	
		Too clayey	0.50			Hard to compact	1.00
		Depth to saturated zone	0.29			Too clayey	0.50
						Depth to saturated zone	0.04

Table 14b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7545:							
Sharpsburg----------	55	Somewhat limited		Not limited		Very limited	
		Too clayey	0.50			Hard to compact	1.00
		Depth to saturated zone	0.29			Too clayey	0.50
						Depth to saturated zone	0.04
Urban land----------	45	Not rated		Not rated		Not rated	
7603:							
Sibleyville---------	85	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
7607:							
Sibleyville---------	45	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	0.50			Too clayey	0.50
Vinland-------------	35	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	0.50			Too clayey	0.50
7658:							
Vinland-------------	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
Rock outcrop--------	20	Not rated		Not rated		Not rated	
7805:							
Arisburg------------	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	0.99	Too clayey	1.00
		Too clayey	0.50			Depth to saturated zone	0.99
8101:							
Hepler--------------	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
8301:							
Verdigris-----------	85	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
8302:							
Verdigris-----------	90	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
8390:							
Wynona--------------	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				

Table 14b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
8501:							
Mason	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Too clayey	0.50	Flooding	0.40	Too clayey	0.50
		Flooding	0.40				
8640:							
Bucyrus	85	Very limited		Not limited		Very limited	
		Depth to bedrock	1.00			Too clayey	1.00
		Too clayey	1.00			Hard to compact	1.00
8641:							
Bucyrus	85	Very limited		Not limited		Very limited	
		Depth to bedrock	1.00			Too clayey	1.00
		Too clayey	1.00			Hard to compact	1.00
8663:							
Clareson	60	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	0.50	Slope	0.04	Too clayey	0.50
		Slope	0.04			Slope	0.04
Rock outcrop	20	Not rated		Not rated		Not rated	
8789:							
Lebo	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Too clayey	0.50			Gravel content	0.86
8911:							
Summit	85	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Depth to saturated zone	0.75	Too clayey	1.00
		Depth to saturated zone	0.99			Hard to compact	1.00
						Depth to saturated zone	0.86
8912:							
Summit	85	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Depth to saturated zone	0.75	Too clayey	1.00
		Depth to saturated zone	0.99			Hard to compact	1.00
						Depth to saturated zone	0.86
8953:							
Wagstaff	85	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
8955:							
Wagstaff	85	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00

Table 14b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
8957:							
Wagstaff	45	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
Summit	35	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Depth to saturated zone	0.75	Too clayey	1.00
		Depth to saturated zone	0.99			Hard to compact	1.00
						Depth to saturated zone	0.86
8962:							
Woodson	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
9967:							
Arents, landfill	100	Not rated		Not rated		Not rated	
9971:							
Arents, earthen dam	100	Not rated		Not rated		Not rated	
9982:							
Fluvents	100	Not rated		Not rated		Not rated	
9983:							
Pits, quarries	100	Not rated		Not rated		Not rated	
9984:							
Made land	100	Not rated		Not rated		Not rated	
9986:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
9991:							
Orthents	100	Not rated		Not rated		Not rated	
9993:							
Pits	100	Not rated		Not rated		Not rated	
9999:							
Water	100	Not rated		Not rated		Not rated	

Table 15a.--Agricultural Waste Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value
4015:					
Chase	90	Very limited		Very limited	
		Restricted permeability	1.00	Flooding	1.00
		Depth to saturated zone	0.99	Restricted permeability	1.00
		Flooding	0.60	Depth to saturated zone	0.99
4752:					
Sogn	55	Very limited		Very limited	
		Depth to bedrock	1.00	Droughty	1.00
		Droughty	1.00	Depth to bedrock	1.00
		Runoff	0.40	Low adsorption	1.00
Vinland	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Droughty	0.96	Low adsorption	1.00
		Slope	0.84	Droughty	0.96
7031:					
Eudora	85	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
7035:					
Eudora	55	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
Bismarckgrove	25	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
		Restricted permeability	0.30	Restricted permeability	0.22
7036:					
Eudora	50	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
Bismarckgrove	25	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
		Restricted permeability	0.30	Restricted permeability	0.22
7050:					
Kennebec	85	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
		Depth to saturated zone	0.09	Depth to saturated zone	0.09
7051:					
Kennebec	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.09	Depth to saturated zone	0.09

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
7055:					
Kimo----------------	85	Very limited		Very limited	
		Restricted permeability	1.00	Flooding	1.00
		Depth to saturated zone	0.99	Restricted permeability	1.00
		Flooding	0.60	Depth to saturated zone	0.99
7089:					
Stonehouse----------	50	Very limited		Very limited	
		Filtering capacity	0.99	Flooding	1.00
		Flooding	0.60	Filtering capacity	0.99
		Leaching	0.45		
Eudora--------------	30	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
7090:					
Wabash--------------	91	Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	0.60	Flooding	1.00
7105:					
Belvue--------------	85	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
7106:					
Eudora--------------	55	Not limited		Somewhat limited	
				Flooding	0.40
Bismarckgrove-------	30	Somewhat limited		Somewhat limited	
		Restricted permeability	0.30	Flooding	0.40
				Restricted permeability	0.22
7123:					
Eudora--------------	85	Not limited		Somewhat limited	
				Flooding	0.40
7155:					
Kimo----------------	85	Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
				Flooding	0.40
7170:					
Reading-------------	90	Somewhat limited		Somewhat limited	
		Too acid	0.03	Flooding	0.40
				Too acid	0.14

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value
7251:					
Grundy	100	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Restricted permeability	1.00	Restricted permeability	1.00
7261:					
Gymer	88	Somewhat limited		Somewhat limited	
		Restricted permeability	0.30	Too acid	0.42
		Too acid	0.11	Restricted permeability	0.22
7285:					
Ladoga	90	Somewhat limited		Somewhat limited	
		Restricted permeability	0.30	Restricted permeability	0.22
		Too acid	0.01	Too acid	0.03
7286:					
Ladoga	85	Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63
		Restricted permeability	0.30	Restricted permeability	0.22
		Too acid	0.01	Too acid	0.03
7302:					
Martin	90	Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
		Too acid	0.03	Too acid	0.14
7330:					
Martin	45	Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
		Slope	0.04	Too acid	0.14
Vinland	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Droughty	0.91	Low adsorption	1.00
		Slope	0.63	Droughty	0.91
7433:					
Morrill	85	Somewhat limited		Somewhat limited	
		Restricted permeability	0.30	Restricted permeability	0.22
		Too acid	0.02	Too acid	0.07
7460:					
Oska	88	Very limited		Very limited	
		Restricted permeability	1.00	Low adsorption	1.00
		Too acid	0.03	Restricted permeability	1.00
		Depth to bedrock	0.01	Too acid	0.14

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
7462:					
Oska----------------	50	Very limited		Very limited	
		Restricted permeability	1.00	Low adsorption	1.00
		Depth to bedrock	0.29	Restricted permeability	1.00
		Too acid	0.03	Depth to bedrock	0.29
Martin--------------	30	Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
		Too acid	0.03	Too acid	0.14
7502:					
Pawnee--------------	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Restricted permeability	1.00	Restricted permeability	1.00
		Runoff	0.40		
7525:					
Chillicothe---------	85	Somewhat limited		Very limited	
		Depth to saturated zone	0.86	Low adsorption	1.00
		Too acid	0.03	Depth to saturated zone	0.86
				Too acid	0.14
7535:					
Sharpsburg----------	85	Somewhat limited		Somewhat limited	
		Restricted permeability	0.30	Depth to saturated zone	0.29
		Depth to saturated zone	0.29	Restricted permeability	0.22
		Too acid	0.02	Too acid	0.07
7545:					
Sharpsburg----------	55	Somewhat limited		Somewhat limited	
		Restricted permeability	0.30	Depth to saturated zone	0.29
		Depth to saturated zone	0.29	Restricted permeability	0.22
		Too acid	0.02	Too acid	0.07
Urban land----------	45	Not rated		Not rated	
7603:					
Sibleyville---------	85	Somewhat limited		Very limited	
		Depth to bedrock	0.71	Low adsorption	1.00
		Droughty	0.43	Depth to bedrock	0.71
				Droughty	0.43

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value
7607:					
Sibleyville---------	45	Somewhat limited		Very limited	
		Depth to bedrock	0.54	Low adsorption	1.00
		Droughty	0.14	Depth to bedrock	0.54
				Droughty	0.14
Vinland-------------	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Droughty	0.80	Low adsorption	1.00
		Runoff	0.40	Droughty	0.80
7658:					
Vinland-------------	60	Very limited		Very limited	
		Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Low adsorption	1.00
		Droughty	0.90	Slope	1.00
Rock outcrop--------	20	Not rated		Not rated	
7805:					
Arisburg------------	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Restricted permeability	0.30	Restricted permeability	0.22
8101:					
Hepler--------------	90	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	0.60	Flooding	1.00
		Restricted permeability	0.30	Restricted permeability	0.22
8301:					
Verdigris-----------	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
8302:					
Verdigris-----------	90	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
8390:					
Wynona--------------	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Restricted permeability	1.00	Flooding	1.00
		Flooding	0.60	Restricted permeability	1.00
8501:					
Mason---------------	85	Somewhat limited		Somewhat limited	
		Restricted permeability	0.30	Flooding	0.40
		Too acid	0.02	Restricted permeability	0.22
				Too acid	0.07

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value
8640:					
Bucyrus	85	Very limited		Very limited	
		Restricted permeability	1.00	Low adsorption	1.00
		Too acid	0.03	Restricted permeability	1.00
				Too acid	0.14
8641:					
Bucyrus	85	Very limited		Very limited	
		Restricted permeability	1.00	Low adsorption	1.00
		Too acid	0.03	Restricted permeability	1.00
				Too acid	0.14
8663:					
Clareson	60	Very limited		Very limited	
		Restricted permeability	1.00	Low adsorption	1.00
		Droughty	1.00	Restricted permeability	1.00
		Depth to bedrock	0.20	Droughty	1.00
Rock outcrop	20	Not rated		Not rated	
8789:					
Lebo	85	Very limited		Very limited	
		Slope	1.00	Low adsorption	1.00
		Droughty	0.73	Slope	1.00
		Depth to bedrock	0.01	Droughty	0.73
8911:					
Summit	85	Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
8912:					
Summit	85	Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
8953:					
Wagstaff	85	Very limited		Very limited	
		Restricted permeability	1.00	Low adsorption	1.00
		Depth to bedrock	0.20	Restricted permeability	1.00
		Too acid	0.11	Too acid	0.42
8955:					
Wagstaff	85	Very limited		Very limited	
		Restricted permeability	1.00	Low adsorption	1.00
		Depth to bedrock	0.20	Restricted permeability	1.00
		Too acid	0.11	Too acid	0.42

Table 15a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value
8957:					
Wagstaff	45	Very limited		Very limited	
		Restricted permeability	1.00	Low adsorption	1.00
		Depth to bedrock	0.20	Restricted permeability	1.00
		Too acid	0.11	Too acid	0.42
Summit	35	Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
8962:					
Woodson	85	Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Runoff	0.40	Too acid	0.14
9967:					
Arents, landfill	100	Not rated		Not rated	
9971:					
Arents, earthen dam	100	Not rated		Not rated	
9982:					
Fluvents	100	Not rated		Not rated	
9983:					
Pits, quarries	100	Not rated		Not rated	
9984:					
Made land	100	Not rated		Not rated	
9986:					
Miscellaneous water	100	Not rated		Not rated	
9991:					
Orthents	100	Not rated		Not rated	
9993:					
Pits	100	Not rated		Not rated	
9999:					
Water	100	Not rated		Not rated	

Table 15b.--Agricultural Waste Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
4015:					
Chase---------------	90	Very limited		Very limited	
		Restricted permeability	1.00	Flooding	1.00
		Depth to saturated zone	0.99	Seepage	1.00
		Flooding	0.60	Depth to saturated zone	0.99
4752:					
Sogn----------------	55	Very limited		Very limited	
		Droughty	1.00	Seepage	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Too steep for surface application	1.00	Too steep for surface application	0.78
Vinland-------------	30	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Too steep for surface application	1.00	Depth to bedrock	1.00
		Droughty	0.96	Too steep for surface application	1.00
7031:					
Eudora--------------	85	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
				Seepage	1.00
7035:					
Eudora--------------	55	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
				Seepage	1.00
Bismarckgrove-------	25	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
		Restricted permeability	0.22	Seepage	1.00
7036:					
Eudora--------------	50	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
				Seepage	1.00
Bismarckgrove-------	25	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
		Restricted permeability	0.22	Seepage	1.00
7050:					
Kennebec------------	85	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
		Depth to saturated zone	0.09	Seepage	1.00
				Depth to saturated zone	0.09

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation: Rating class and limiting features	Value	Overland flow of wastewater: Rating class and limiting features	Value
7051:					
Kennebec	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.09	Seepage	1.00
				Depth to saturated zone	0.09
7055:					
Kimo	85	Very limited		Very limited	
		Restricted permeability	1.00	Flooding	1.00
				Too level	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
		Flooding	0.60		
7089:					
Stonehouse	50	Very limited		Very limited	
		Filtering capacity	0.99	Flooding	1.00
				Seepage	1.00
		Flooding	0.60		
Eudora	30	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
				Seepage	1.00
7090:					
Wabash	91	Very limited		Very limited	
		Restricted permeability	1.00	Flooding	1.00
				Depth to saturated zone	1.00
		Depth to saturated zone	1.00		
		Flooding	0.60		
7105:					
Belvue	85	Very limited		Very limited	
		Too steep for surface application	1.00	Flooding	1.00
				Seepage	1.00
				Too steep for surface application	0.22
		Flooding	0.60		
		Too steep for sprinkler application	0.10		
7106:					
Eudora	55	Not limited		Very limited	
				Seepage	1.00
				Flooding	0.40
Bismarckgrove	30	Somewhat limited		Very limited	
		Restricted permeability	0.22	Seepage	1.00
				Flooding	0.40
7123:					
Eudora	85	Not limited		Very limited	
				Seepage	1.00
				Flooding	0.40

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation: Rating class and limiting features	Value	Overland flow of wastewater: Rating class and limiting features	Value
7155:					
Kimo	85	Very limited		Very limited	
		Restricted permeability	1.00	Too level	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
				Flooding	0.40
7170:					
Reading	90	Somewhat limited		Very limited	
		Too acid	0.14	Seepage	1.00
				Flooding	0.40
				Too acid	0.14
7251:					
Grundy	100	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Restricted permeability	1.00	Depth to saturated zone	1.00
7261:					
Gymer	88	Somewhat limited		Very limited	
		Too steep for surface application	0.68	Seepage	1.00
		Too acid	0.42	Too acid	0.42
		Restricted permeability	0.22		
7285:					
Ladoga	90	Somewhat limited		Very limited	
		Too steep for surface application	0.68	Seepage	1.00
		Restricted permeability	0.22	Too acid	0.03
		Too acid	0.03		
7286:					
Ladoga	85	Very limited		Very limited	
		Too steep for surface application	1.00	Seepage	1.00
		Too steep for sprinkler application	0.78	Too steep for surface application	1.00
		Restricted permeability	0.22	Too acid	0.03
7302:					
Martin	90	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Seepage	0.77
		Too acid	0.14	Too acid	0.14

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation: Rating class and limiting features	Value	Overland flow of wastewater: Rating class and limiting features	Value
7330:					
Martin	45	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	0.99
		Too steep for surface application	1.00	Seepage	0.77
		Depth to saturated zone	0.99	Too steep for surface application	0.50
Vinland	40	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Too steep for surface application	1.00	Depth to bedrock	1.00
		Droughty	0.91	Too steep for surface application	1.00
7433:					
Morrill	85	Somewhat limited		Very limited	
		Too steep for surface application	0.68	Seepage	1.00
		Restricted permeability	0.22	Too acid	0.07
		Too acid	0.07		
7460:					
Oska	88	Very limited		Very limited	
		Restricted permeability	1.00	Depth to bedrock	1.00
		Too steep for surface application	0.32	Seepage	0.77
		Too acid	0.14	Too acid	0.14
7462:					
Oska	50	Very limited		Very limited	
		Restricted permeability	1.00	Depth to bedrock	1.00
		Too steep for surface application	0.68	Seepage	0.77
		Depth to bedrock	0.29	Too acid	0.14
Martin	30	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Seepage	0.77
		Too steep for surface application	0.68	Too acid	0.14

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
7502:					
Pawnee	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Restricted permeability	1.00	Seepage	0.77
		Too steep for surface application	0.32		
7525:					
Chillicothe	85	Somewhat limited		Very limited	
		Depth to saturated zone	0.86	Seepage	1.00
		Too acid	0.14	Depth to saturated zone	0.86
		Too steep for surface application	0.08	Too acid	0.14
7535:					
Sharpsburg	85	Somewhat limited		Very limited	
		Too steep for surface application	0.68	Seepage	1.00
		Depth to saturated zone	0.29	Depth to saturated zone	0.29
		Restricted permeability	0.22	Too acid	0.07
7545:					
Sharpsburg	55	Somewhat limited		Very limited	
		Too steep for surface application	0.68	Seepage	1.00
		Depth to saturated zone	0.29	Depth to saturated zone	0.29
		Restricted permeability	0.22	Too acid	0.07
Urban land	45	Not rated		Not rated	
7603:					
Sibleyville	85	Somewhat limited		Very limited	
		Depth to bedrock	0.71	Seepage	1.00
		Droughty	0.43	Depth to bedrock	1.00
		Too steep for surface application	0.32		

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
7607:					
Sibleyville	45	Somewhat limited		Very limited	
		Depth to bedrock	0.54	Seepage	1.00
		Too steep for surface application	0.32	Depth to bedrock	1.00
		Droughty	0.14		
Vinland	35	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Droughty	0.80	Depth to bedrock	1.00
		Too steep for surface application	0.32		
7658:					
Vinland	60	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Too steep for surface application	1.00	Depth to bedrock	1.00
				Too steep for surface application	1.00
		Too steep for sprinkler application	1.00		
Rock outcrop	20	Not rated		Not rated	
7805:					
Arisburg	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Restricted permeability	0.22	Depth to saturated zone	1.00
8101:					
Hepler	90	Very limited		Very limited	
		Depth to saturated zone	1.00	Flooding	1.00
				Seepage	1.00
		Flooding	0.60	Depth to saturated zone	1.00
		Restricted permeability	0.22		
8301:					
Verdigris	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
				Seepage	1.00
8302:					
Verdigris	90	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
				Seepage	1.00
8390:					
Wynona	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Flooding	1.00
				Seepage	1.00
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Flooding	0.60		

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
8501:					
Mason	85	Somewhat limited		Very limited	
		Restricted permeability	0.22	Seepage	1.00
				Flooding	0.40
		Too acid	0.07	Too acid	0.07
8640:					
Bucyrus	85	Very limited		Very limited	
		Restricted permeability	1.00	Seepage	1.00
				Too acid	0.14
		Too acid	0.14		
8641:					
Bucyrus	85	Very limited		Very limited	
		Restricted permeability	1.00	Seepage	1.00
				Too acid	0.14
		Too steep for surface application	0.68		
		Too acid	0.14		
8663:					
Clareson	60	Very limited		Very limited	
		Restricted permeability	1.00	Seepage	1.00
				Depth to bedrock	1.00
		Droughty	1.00	Too steep for surface application	0.50
		Too steep for surface application	1.00		
Rock outcrop	20	Not rated		Not rated	
8789:					
Lebo	85	Very limited		Very limited	
		Too steep for surface application	1.00	Seepage	1.00
				Depth to bedrock	1.00
				Too steep for surface application	1.00
		Too steep for sprinkler application	1.00		
		Droughty	0.73		
8911:					
Summit	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Seepage	0.77
8912:					
Summit	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Seepage	0.77
		Too steep for surface application	0.68		

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation: Rating class and limiting features	Value	Overland flow of wastewater: Rating class and limiting features	Value
8953:					
Wagstaff------------	85	Very limited		Very limited	
		Restricted permeability	1.00	Seepage	1.00
		Too acid	0.42	Depth to bedrock	1.00
		Depth to bedrock	0.20	Too acid	0.42
8955:					
Wagstaff------------	85	Very limited		Very limited	
		Restricted permeability	1.00	Seepage	1.00
		Too acid	0.42	Depth to bedrock	1.00
		Too steep for surface application	0.32	Too acid	0.42
8957:					
Wagstaff------------	45	Very limited		Very limited	
		Restricted permeability	1.00	Seepage	1.00
		Too steep for surface application	0.68	Depth to bedrock	1.00
		Too acid	0.42	Too acid	0.42
Summit--------------	35	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Seepage	0.77
		Too steep for surface application	0.68		
8962:					
Woodson-------------	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.77
		Too acid	0.14	Too acid	0.14
9967:					
Arents, landfill----	100	Not rated		Not rated	
9971:					
Arents, earthen dam-	100	Not rated		Not rated	
9982:					
Fluvents------------	100	Not rated		Not rated	
9983:					
Pits, quarries------	100	Not rated		Not rated	
9984:					
Made land-----------	100	Not rated		Not rated	

Table 15b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
9986:					
Miscellaneous water-	100	Not rated		Not rated	
9991:					
Orthents------------	100	Not rated		Not rated	
9993:					
Pits----------------	100	Not rated		Not rated	
9999:					
Water---------------	100	Not rated		Not rated	

Table 15c.--Agricultural Waste Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
4015:					
Chase	90	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Restricted permeability	0.94
		Flooding	0.60	Flooding	0.60
4752:					
Sogn	55	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Restricted permeability	1.00	Too steep for surface application	1.00
		Slope	1.00	Too steep for sprinkler application	0.78
Vinland	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Restricted permeability	1.00	Too steep for surface application	1.00
		Slope	1.00	Too steep for sprinkler application	1.00
7031:					
Eudora	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Flooding	0.60
		Flooding	0.60		
7035:					
Eudora	55	Very limited		Somewhat limited	
		Restricted permeability	1.00	Flooding	0.60
		Flooding	0.60		
Bismarckgrove	25	Very limited		Somewhat limited	
		Restricted permeability	1.00	Flooding	0.60
		Flooding	0.60	Restricted permeability	0.15
7036:					
Eudora	50	Very limited		Somewhat limited	
		Restricted permeability	1.00	Flooding	0.60
		Flooding	0.60		
Bismarckgrove	25	Very limited		Somewhat limited	
		Restricted permeability	1.00	Flooding	0.60
		Flooding	0.60	Restricted permeability	0.15

Table 15c.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
7050:					
Kennebec	85	Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Flooding	0.60
		Restricted permeability	1.00	Depth to saturated zone	0.09
		Flooding	0.60		
7051:					
Kennebec	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	0.09
		Restricted permeability	1.00		
7055:					
Kimo	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	1.00	Restricted permeability	0.94
		Flooding	0.60	Flooding	0.60
7089:					
Stonehouse	50	Somewhat limited		Very limited	
		Flooding	0.60	Filtering capacity	0.99
		Restricted permeability	0.32	Flooding	0.60
Eudora	30	Very limited		Somewhat limited	
		Restricted permeability	1.00	Flooding	0.60
		Flooding	0.60		
7090:					
Wabash	91	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Restricted permeability	1.00
		Flooding	0.60	Flooding	0.60
7105:					
Belvue	85	Very limited		Very limited	
		Restricted permeability	1.00	Too steep for surface application	1.00
		Slope	1.00		
		Flooding	0.60	Flooding	0.60
				Too steep for sprinkler application	0.22
7106:					
Eudora	55	Very limited		Not limited	
		Restricted permeability	1.00		
Bismarckgrove	30	Very limited		Somewhat limited	
		Restricted permeability	1.00	Restricted permeability	0.15

Table 15c.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
7123:					
Eudora	85	Very limited		Not limited	
		Restricted permeability	1.00		
7155:					
Kimo	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	1.00	Restricted permeability	0.94
7170:					
Reading	90	Very limited		Somewhat limited	
		Restricted permeability	1.00	Too acid	0.14
7251:					
Grundy	100	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Restricted permeability	0.94
7261:					
Gymer	88	Very limited		Somewhat limited	
		Restricted permeability	1.00	Too steep for surface application	0.68
		Slope	0.50	Too acid	0.42
				Restricted permeability	0.15
7285:					
Ladoga	90	Very limited		Somewhat limited	
		Restricted permeability	1.00	Too steep for surface application	0.68
		Slope	0.50	Restricted permeability	0.15
				Too acid	0.03
7286:					
Ladoga	85	Very limited		Very limited	
		Slope	1.00	Too steep for surface application	1.00
		Restricted permeability	1.00	Too steep for sprinkler application	1.00
				Restricted permeability	0.15
7302:					
Martin	90	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Restricted permeability	0.94
				Too acid	0.14

Table 15c.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
7330:					
Martin	45	Very limited		Very limited	
		Restricted permeability	1.00	Too steep for surface application	1.00
		Slope	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Restricted permeability	0.94
Vinland	40	Very limited		Very limited	
		Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Too steep for surface application	1.00
		Restricted permeability	1.00	Too steep for sprinkler application	1.00
7433:					
Morrill	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Too steep for surface application	0.68
		Slope	0.50	Restricted permeability	0.15
				Too acid	0.07
7460:					
Oska	88	Very limited		Very limited	
		Restricted permeability	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Restricted permeability	0.94
		Slope	0.12	Too steep for surface application	0.32
7462:					
Oska	50	Very limited		Very limited	
		Restricted permeability	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Restricted permeability	0.94
		Slope	0.50	Too steep for surface application	0.68
Martin	30	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Restricted permeability	0.94
		Slope	0.50	Too steep for surface application	0.68

Table 15c.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
7502:					
Pawnee	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Restricted permeability	0.94
		Slope	0.12	Too steep for surface application	0.32
7525:					
Chillicothe	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Depth to saturated zone	0.86
		Depth to saturated zone	0.86	Too acid	0.14
				Too steep for surface application	0.08
7535:					
Sharpsburg	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Too steep for surface application	0.68
		Slope	0.50		
		Depth to saturated zone	0.29	Depth to saturated zone	0.29
				Restricted permeability	0.15
7545:					
Sharpsburg	55	Very limited		Somewhat limited	
		Restricted permeability	1.00	Too steep for surface application	0.68
		Slope	0.50		
		Depth to saturated zone	0.29	Depth to saturated zone	0.29
				Restricted permeability	0.15
Urban land	45	Not rated		Not rated	
7603:					
Sibleyville	85	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Restricted permeability	1.00	Too steep for surface application	0.32
		Slope	0.12		
7607:					
Sibleyville	45	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Restricted permeability	1.00	Too steep for surface application	0.32
		Slope	0.12		
Vinland	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Restricted permeability	1.00	Too steep for surface application	0.32
		Slope	0.12		

Table 15c.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
7658:					
Vinland	60	Very limited		Very limited	
		Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Too steep for surface application	1.00
		Restricted permeability	1.00	Too steep for sprinkler application	1.00
Rock outcrop	20	Not rated		Not rated	
7805:					
Arisburg	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Restricted permeability	0.15
8101:					
Hepler	90	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Flooding	0.60
		Flooding	0.60	Restricted permeability	0.15
8301:					
Verdigris	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	1.00		
8302:					
Verdigris	90	Very limited		Somewhat limited	
		Restricted permeability	1.00	Flooding	0.60
		Flooding	0.60		
8390:					
Wynona	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Restricted permeability	0.94
		Flooding	0.60	Flooding	0.60
8501:					
Mason	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Restricted permeability	0.15
				Too acid	0.07
8640:					
Bucyrus	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Restricted permeability	0.94
		Depth to bedrock	1.00	Too acid	0.14

Table 15c.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
8641:					
Bucyrus	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Restricted permeability	0.94
		Depth to bedrock	1.00	Too steep for surface application	0.68
		Slope	0.50	Too acid	0.14
8663:					
Clareson	60	Very limited		Very limited	
		Restricted permeability	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Too steep for surface application	1.00
		Slope	1.00	Restricted permeability	0.94
Rock outcrop	20	Not rated		Not rated	
8789:					
Lebo	85	Very limited		Very limited	
		Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Too steep for surface application	1.00
		Restricted permeability	1.00	Too steep for sprinkler application	1.00
8911:					
Summit	85	Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
8912:					
Summit	85	Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
		Slope	0.50	Too steep for surface application	0.68
8953:					
Wagstaff	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Restricted permeability	0.94
				Too acid	0.42
8955:					
Wagstaff	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Restricted permeability	0.94
		Slope	0.12	Too acid	0.42

Table 15c.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
8957:					
Wagstaff------------	45	Very limited		Very limited	
		Restricted permeability	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Restricted permeability	0.94
		Slope	0.50	Too steep for surface application	0.68
Summit--------------	35	Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
		Slope	0.50	Too steep for surface application	0.68
8962:					
Woodson-------------	85	Very limited		Very limited	
		Restricted permeability	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Restricted permeability	1.00
				Too acid	0.14
9967:					
Arents, landfill----	100	Not rated		Not rated	
9971:					
Arents, earthen dam-	100	Not rated		Not rated	
9982:					
Fluvents------------	100	Not rated		Not rated	
9983:					
Pits, quarries------	100	Not rated		Not rated	
9984:					
Made land-----------	100	Not rated		Not rated	
9986:					
Miscellaneous water-	100	Not rated		Not rated	
9991:					
Orthents------------	100	Not rated		Not rated	
9993:					
Pits----------------	100	Not rated		Not rated	
9999:					
Water---------------	100	Not rated		Not rated	

Table 16a.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
4015:					
Chase	90	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
4752:					
Sogn	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Vinland	30	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7031:					
Eudora	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7035:					
Eudora	55	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Bismarckgrove	25	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7036:					
Eudora	50	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Bismarckgrove	25	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
7050:					
Kennebec	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7051:					
Kennebec	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
7055:					
Kimo	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00

Table 16a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value
7089:					
Stonehouse----------	50	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.03
		Bottom layer	0.00	Bottom layer	0.13
Eudora--------------	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
7090:					
Wabash--------------	91	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7105:					
Belvue--------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
7106:					
Eudora--------------	55	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Bismarckgrove-------	30	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7123:					
Eudora--------------	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7155:					
Kimo----------------	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7170:					
Reading-------------	90	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7251:					
Grundy--------------	100	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7261:					
Gymer---------------	88	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
7285:					
Ladoga--------------	90	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7286:					
Ladoga--------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 16a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value
7302:					
Martin	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
7330:					
Martin	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Vinland	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
7433:					
Morrill	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
7460:					
Oska	88	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7462:					
Oska	50	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Martin	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
7502:					
Pawnee	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7525:					
Chillicothe	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7535:					
Sharpsburg	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7545:					
Sharpsburg	55	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Urban land	45	Not rated		Not rated	
7603:					
Sibleyville	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 16a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
7607:					
Sibleyville---------	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Vinland-------------	35	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
7658:					
Vinland-------------	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Rock outcrop--------	20	Not rated		Not rated	
7805:					
Arisburg------------	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
8101:					
Hepler--------------	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
8301:					
Verdigris-----------	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
8302:					
Verdigris-----------	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
8390:					
Wynona--------------	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
8501:					
Mason---------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
8640:					
Bucyrus-------------	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
8641:					
Bucyrus-------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
8663:					
Clareson------------	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Rock outcrop--------	20	Not rated		Not rated	

Table 16a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
8789:					
Lebo----------------	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
8911:					
Summit--------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
8912:					
Summit--------------	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
8953:					
Wagstaff------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
8955:					
Wagstaff------------	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
8957:					
Wagstaff------------	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Summit--------------	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
8962:					
Woodson-------------	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
9967:					
Arents, landfill----	100	Not rated		Not rated	
9971:					
Arents, earthen dam-	100	Not rated		Not rated	
9982:					
Fluvents------------	100	Not rated		Not rated	
9983:					
Pits, quarries------	100	Not rated		Not rated	
9984:					
Made land-----------	100	Not rated		Not rated	
9986:					
Miscellaneous water-	100	Not rated		Not rated	

Table 16a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
9991:					
Orthents------------	100	Not rated		Not rated	
9993:					
Pits----------------	100	Not rated		Not rated	
9999:					
Water---------------	100	Not rated		Not rated	

Table 16b.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4015:							
Chase	90	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Water erosion	0.99	Shrink-swell	0.05	Depth to saturated zone	0.53
				Depth to saturated zone	0.53		
4752:							
Sogn	55	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Low strength	0.00	Rock fragments	0.68
		Too clayey	0.98	Shrink-swell	0.87	Slope	0.84
Vinland	30	Poor		Poor		Poor	
		Depth to bedrock	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
		Droughty	0.04	Low strength	0.00	Slope	0.16
		Water erosion	0.90	Shrink-swell	0.80	Rock fragments	0.50
7031:							
Eudora	85	Fair		Good		Good	
		Water erosion	0.90				
		Low content of organic matter	0.92				
7035:							
Eudora	55	Fair		Good		Good	
		Water erosion	0.90				
		Low content of organic matter	0.92				
Bismarckgrove	25	Fair		Good		Good	
		Low content of organic matter	0.18				
		Water erosion	0.90				
7036:							
Eudora	50	Fair		Good		Good	
		Water erosion	0.90				
		Low content of organic matter	0.92				
Bismarckgrove	25	Fair		Good		Good	
		Low content of organic matter	0.18				
		Water erosion	0.90				
7050:							
Kennebec	85	Fair		Poor		Good	
		Low content of organic matter	0.88	Low strength	0.00		
				Shrink-swell	0.97		
7051:							
Kennebec	85	Fair		Poor		Good	
		Low content of organic matter	0.88	Low strength	0.00		
				Shrink-swell	0.97		

Table 16b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
7055:							
Kimo	85	Fair		Fair		Fair	
		Low content of organic matter	0.50	Depth to saturated zone	0.53	Depth to saturated zone	0.53
		Water erosion	0.99	Shrink-swell	0.99		
7089:							
Stonehouse	50	Poor		Good		Poor	
		Too sandy	0.00			Too sandy	0.00
		Wind erosion	0.00				
		Low content of organic matter	0.50				
Eudora	30	Fair		Good		Good	
		Water erosion	0.90				
		Low content of organic matter	0.92				
7090:							
Wabash	91	Poor		Poor		Poor	
		Too clayey	0.00	Depth to saturated zone	0.00	Too clayey	0.00
		Water erosion	0.99	Low strength	0.00	Depth to saturated zone	0.00
				Shrink-swell	0.00		
7105:							
Belvue	85	Fair		Good		Good	
		Low content of organic matter	0.08				
		Water erosion	0.90				
7106:							
Eudora	55	Fair		Good		Good	
		Water erosion	0.90				
		Low content of organic matter	0.92				
Bismarckgrove	30	Fair		Good		Good	
		Low content of organic matter	0.18				
		Water erosion	0.90				
7123:							
Eudora	85	Fair		Good		Good	
		Water erosion	0.90				
		Low content of organic matter	0.92				
7155:							
Kimo	85	Fair		Fair		Fair	
		Low content of organic matter	0.50	Depth to saturated zone	0.53	Depth to saturated zone	0.53
		Water erosion	0.99	Shrink-swell	0.99		
7170:							
Reading	90	Fair		Poor		Fair	
		Too clayey	0.82	Low strength	0.00	Too clayey	0.72
		Water erosion	0.90	Shrink-swell	0.54		
		Too acid	0.95				

Table 16b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
7251:							
Grundy	100	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Low content of organic matter	0.18	Depth to saturated zone	0.02	Depth to saturated zone	0.02
		Too acid	0.95	Shrink-swell	0.21		
7261:							
Gymer	88	Fair		Poor		Fair	
		Too clayey	0.02	Low strength	0.00	Too clayey	0.02
		Low content of organic matter	0.32	Shrink-swell	0.33		
		Too acid	0.84				
7285:							
Ladoga	90	Fair		Poor		Fair	
		Too clayey	0.08	Low strength	0.00	Too clayey	0.06
		Low content of organic matter	0.50	Shrink-swell	0.49		
		Too acid	0.74				
7286:							
Ladoga	85	Fair		Poor		Fair	
		Too clayey	0.08	Low strength	0.00	Too clayey	0.06
		Low content of organic matter	0.50	Shrink-swell	0.49	Slope	0.37
		Too acid	0.74				
7302:							
Martin	90	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Low content of organic matter	0.88	Shrink-swell	0.00	Depth to saturated zone	0.53
		Too acid	0.95	Depth to saturated zone	0.53		
7330:							
Martin	45	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Low content of organic matter	0.88	Shrink-swell	0.00	Depth to saturated zone	0.53
		Too acid	0.95	Depth to saturated zone	0.53	Slope	0.96
Vinland	40	Poor		Poor		Poor	
		Depth to bedrock	0.00	Low strength	0.00	Depth to bedrock	0.00
		Droughty	0.09	Depth to bedrock	0.00	Slope	0.37
		Water erosion	0.90	Shrink-swell	0.75	Rock fragments	0.76
7433:							
Morrill	85	Fair		Fair		Fair	
		Low content of organic matter	0.18	Shrink-swell	0.84	Rock fragments	0.18
		Too acid	0.97				
		Water erosion	0.99				
7460:							
Oska	88	Poor		Poor		Poor	
		Too clayey	0.00	Depth to bedrock	0.00	Too clayey	0.00
		Too acid	0.95	Low strength	0.00	Depth to bedrock	0.99
		Depth to bedrock	0.99	Shrink-swell	0.00		

Table 16b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
7462:							
Oska	50	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Low content of organic matter	0.50	Depth to bedrock	0.00	Depth to bedrock	0.71
		Depth to bedrock	0.71	Shrink-swell	0.01		
Martin	30	Poor		Poor		Poor	
		Too clayey	0.00	Shrink-swell	0.00	Too clayey	0.00
		Low content of organic matter	0.88	Low strength	0.00	Depth to saturated zone	0.53
		Too acid	0.95	Depth to saturated zone	0.53		
7502:							
Pawnee	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Water erosion	0.99	Depth to saturated zone	0.02	Depth to saturated zone	0.02
				Shrink-swell	0.25		
7525:							
Chillicothe	85	Fair		Poor		Fair	
		Too clayey	0.68	Low strength	0.00	Too clayey	0.59
		Too acid	0.84	Shrink-swell	0.77	Depth to saturated zone	0.89
				Depth to saturated zone	0.89		
7535:							
Sharpsburg	85	Fair		Poor		Fair	
		Too clayey	0.08	Low strength	0.00	Too clayey	0.07
		Too acid	0.74	Shrink-swell	0.43		
		Water erosion	0.90				
7545:							
Sharpsburg	55	Fair		Poor		Fair	
		Too clayey	0.08	Low strength	0.00	Too clayey	0.07
		Too acid	0.74	Shrink-swell	0.43		
		Water erosion	0.90				
Urban land	45	Not rated		Not rated		Not rated	
7603:							
Sibleyville	85	Fair		Poor		Fair	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Rock fragments	0.01
		Droughty	0.57	Shrink-swell	0.99	Depth to bedrock	0.29
		Low content of organic matter	0.88				
7607:							
Sibleyville	45	Fair		Poor		Fair	
		Depth to bedrock	0.46	Low strength	0.00	Depth to bedrock	0.46
		Droughty	0.86	Depth to bedrock	0.00		
		Too acid	0.97	Shrink-swell	0.86		
Vinland	35	Poor		Poor		Poor	
		Depth to bedrock	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
		Droughty	0.20	Low strength	0.00	Rock fragments	0.76
		Water erosion	0.90	Shrink-swell	0.76	Too clayey	0.80

Table 16b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
7658:							
Vinland	60	Poor		Poor		Poor	
		Depth to bedrock	0.00	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.10	Slope	0.00	Depth to bedrock	0.00
		Water erosion	0.90	Low strength	0.00	Rock fragments	0.76
Rock outcrop	20	Not rated		Not rated		Not rated	
7805:							
Arisburg	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Low content of organic matter	0.12	Shrink-swell	0.05	Depth to saturated zone	0.14
		Water erosion	0.90	Depth to saturated zone	0.14		
8101:							
Hepler	90	Fair		Poor		Fair	
		Low content of organic matter	0.32	Low strength	0.00	Depth to saturated zone	0.02
		Too acid	0.54	Depth to saturated zone	0.02		
		Water erosion	0.99	Shrink-swell	0.89		
8301:							
Verdigris	85	Good		Poor		Good	
				Low strength	0.00		
				Shrink-swell	0.98		
8302:							
Verdigris	90	Good		Poor		Good	
				Low strength	0.00		
				Shrink-swell	0.98		
8390:							
Wynona	85	Fair		Poor		Fair	
		Too acid	0.84	Low strength	0.00	Depth to saturated zone	0.02
		Water erosion	0.90	Depth to saturated zone	0.02	Too clayey	0.76
		Too clayey	0.98	Shrink-swell	0.66		
8501:							
Mason	85	Fair		Poor		Good	
		Low content of organic matter	0.88	Low strength	0.00		
		Too acid	0.97	Shrink-swell	0.89		
		Water erosion	0.99				
8640:							
Bucyrus	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.68	Shrink-swell	0.00		
		Low content of organic matter	0.88				
8641:							
Bucyrus	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.68	Shrink-swell	0.00		
		Low content of organic matter	0.92				

Table 16b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
8663:							
Clareson------------	60	Poor		Poor		Poor	
		Droughty	0.00	Low strength	0.00	Rock fragments	0.00
		Too clayey	0.02	Depth to bedrock	0.00	Too clayey	0.02
		Depth to bedrock	0.79	Cobble content	0.73	Depth to bedrock	0.79
Rock outcrop--------	20	Not rated		Not rated		Not rated	
8789:							
Lebo----------------	85	Fair		Poor		Poor	
		Droughty	0.27	Depth to bedrock	0.00	Rock fragments	0.00
		Depth to bedrock	0.99	Slope	0.08	Slope	0.00
				Shrink-swell	0.94	Depth to bedrock	0.99
8911:							
Summit--------------	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Low content of organic matter	0.88	Shrink-swell	0.00	Depth to saturated zone	0.53
		Water erosion	0.99	Depth to saturated zone	0.53	Rock fragments	0.97
8912:							
Summit--------------	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Low content of organic matter	0.88	Shrink-swell	0.00	Depth to saturated zone	0.53
		Water erosion	0.99	Depth to saturated zone	0.53	Rock fragments	0.97
8953:							
Wagstaff------------	85	Poor		Poor		Poor	
		Too clayey	0.00	Shrink-swell	0.00	Too clayey	0.00
		Depth to bedrock	0.79	Low strength	0.00	Depth to bedrock	0.79
		Too acid	0.84	Depth to bedrock	0.00		
8955:							
Wagstaff------------	85	Poor		Poor		Poor	
		Too clayey	0.00	Depth to bedrock	0.00	Too clayey	0.00
		Depth to bedrock	0.79	Shrink-swell	0.00	Depth to bedrock	0.79
		Too acid	0.84	Low strength	0.00		
8957:							
Wagstaff------------	45	Poor		Poor		Poor	
		Too clayey	0.00	Shrink-swell	0.00	Too clayey	0.00
		Depth to bedrock	0.79	Low strength	0.00	Depth to bedrock	0.79
		Too acid	0.84	Depth to bedrock	0.00		
Summit--------------	35	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Low content of organic matter	0.88	Shrink-swell	0.00	Depth to saturated zone	0.53
		Water erosion	0.99	Depth to saturated zone	0.53	Rock fragments	0.97
8962:							
Woodson-------------	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Water erosion	0.90	Shrink-swell	0.00	Depth to saturated zone	0.02
		Too acid	0.95	Depth to saturated zone	0.02		

Table 16b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9967:							
Arents, landfill----	100	Not rated		Not rated		Not rated	
9971:							
Arents, earthen dam-	100	Not rated		Not rated		Not rated	
9982:							
Fluvents------------	100	Not rated		Not rated		Not rated	
9983:							
Pits, quarries------	100	Not rated		Not rated		Not rated	
9984:							
Made land-----------	100	Not rated		Not rated		Not rated	
9986:							
Miscellaneous water-	100	Not rated		Not rated		Not rated	
9991:							
Orthents------------	100	Not rated		Not rated		Not rated	
9993:							
Pits----------------	100	Not rated		Not rated		Not rated	
9999:							
Water---------------	100	Not rated		Not rated		Not rated	

Table 17.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4015:							
Chase	90	Not limited		Very limited		Very limited	
				Depth to saturated zone	0.99	No ground water	1.00
				Hard to pack	0.26		
4752:							
Sogn	55	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Thin layer	1.00	No ground water	1.00
Vinland	30	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.61	Thin layer	1.00	No ground water	1.00
		Slope	0.01				
7031:							
Eudora	85	Somewhat limited		Very limited		Very limited	
		Seepage	0.43	Piping	1.00	No ground water	1.00
7035:							
Eudora	55	Somewhat limited		Very limited		Very limited	
		Seepage	0.43	Piping	1.00	No ground water	1.00
Bismarckgrove	25	Somewhat limited		Very limited		Very limited	
		Seepage	0.57	Piping	1.00	No ground water	1.00
				Seepage	0.01		
7036:							
Eudora	50	Somewhat limited		Very limited		Very limited	
		Seepage	0.43	Piping	1.00	No ground water	1.00
Bismarckgrove	25	Somewhat limited		Very limited		Very limited	
		Seepage	0.57	Piping	0.99	No ground water	1.00
				Seepage	0.01		
7050:							
Kennebec	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Seepage	0.19	Piping	0.18	Slow refill	0.81
				Depth to saturated zone	0.09	Depth to water	0.54
						Cutbanks cave	0.10
7051:							
Kennebec	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Seepage	0.19	Piping	0.18	Slow refill	0.81
				Depth to saturated zone	0.09	Depth to water	0.54
						Cutbanks cave	0.10
7055:							
Kimo	85	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.43	Depth to saturated zone	0.99	Slow refill	0.57
						Cutbanks cave	0.10
				Piping	0.60	Depth to water	0.01

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
7089:							
Stonehouse	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.13	No ground water	1.00
Eudora	30	Somewhat limited		Very limited		Very limited	
		Seepage	0.43	Piping	1.00	No ground water	1.00
7090:							
Wabash	91	Not limited		Very limited		Very limited	
				Depth to saturated zone	1.00	Slow refill	1.00
						Cutbanks cave	0.10
				Hard to pack	0.83		
7105:							
Belvue	85	Somewhat limited		Very limited		Very limited	
		Seepage	0.57	Piping	1.00	No ground water	1.00
7106:							
Eudora	55	Somewhat limited		Very limited		Very limited	
		Seepage	0.43	Piping	1.00	No ground water	1.00
Bismarckgrove	30	Somewhat limited		Very limited		Very limited	
		Seepage	0.57	Piping	0.99	No ground water	1.00
				Seepage	0.01		
7123:							
Eudora	85	Somewhat limited		Very limited		Very limited	
		Seepage	0.43	Piping	1.00	No ground water	1.00
7155:							
Kimo	85	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.43	Depth to saturated zone	0.99	Slow refill	0.57
						Cutbanks cave	0.10
				Piping	0.60	Depth to water	0.01
7170:							
Reading	90	Somewhat limited		Not limited		Very limited	
		Seepage	0.57			No ground water	1.00
7251:							
Grundy	100	Not limited		Very limited		Very limited	
				Depth to saturated zone	1.00	No ground water	1.00
7261:							
Gymer	88	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			No ground water	1.00
7285:							
Ladoga	90	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			No ground water	1.00
7286:							
Ladoga	85	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			No ground water	1.00
		Slope	0.01				

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7302:							
Martin----------------	90	Not limited		Very limited		Very limited	
				Depth to saturated zone	0.99	No ground water	1.00
				Hard to pack	0.72		
7330:							
Martin----------------	45	Not limited		Very limited		Very limited	
				Depth to saturated zone	0.99	No ground water	1.00
				Hard to pack	0.72		
Vinland---------------	40	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.53	Thin layer	1.00	No ground water	1.00
		Slope	0.01				
7433:							
Morrill---------------	85	Somewhat limited		Not limited		Very limited	
		Seepage	0.57			No ground water	1.00
7460:							
Oska------------------	88	Somewhat limited		Somewhat limited		Very limited	
		Depth to bedrock	0.56	Hard to pack	0.60	No ground water	1.00
				Thin layer	0.56		
7462:							
Oska------------------	50	Somewhat limited		Somewhat limited		Very limited	
		Depth to bedrock	0.81	Thin layer	0.81	No ground water	1.00
				Hard to pack	0.40		
Martin----------------	30	Not limited		Very limited		Very limited	
				Depth to saturated zone	0.99	No ground water	1.00
				Hard to pack	0.71		
7502:							
Pawnee----------------	85	Not limited		Very limited		Very limited	
				Depth to saturated zone	1.00	No ground water	1.00
				Hard to pack	0.31		
7525:							
Chillicothe-----------	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Depth to saturated zone	0.86	No ground water	1.00
7535:							
Sharpsburg------------	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Depth to saturated zone	0.29	No ground water	1.00
7545:							
Sharpsburg------------	55	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Depth to saturated zone	0.29	No ground water	1.00
Urban land------------	45	Not rated		Not rated		Not rated	

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
7603:							
Sibleyville---------	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Thin layer	0.93	No ground water	1.00
		Depth to bedrock	0.19				
7607:							
Sibleyville---------	45	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Thin layer	0.88	No ground water	1.00
		Depth to bedrock	0.13	Piping	0.01		
Vinland-------------	35	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.53	Thin layer	1.00	No ground water	1.00
7658:							
Vinland-------------	60	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.58	Thin layer	1.00	No ground water	1.00
		Slope	0.28				
Rock outcrop--------	20	Not rated		Not rated		Not rated	
7805:							
Arisburg------------	85	Somewhat limited		Very limited		Very limited	
		Seepage	0.05	Depth to saturated zone	1.00	No ground water	1.00
				Hard to pack	0.26		
8101:							
Hepler--------------	90	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Depth to saturated zone	1.00	No ground water	1.00
				Piping	0.03		
8301:							
Verdigris-----------	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.28	No ground water	1.00
8302:							
Verdigris-----------	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.28	No ground water	1.00
8390:							
Wynona--------------	85	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Depth to saturated zone	1.00	No ground water	1.00
8501:							
Mason---------------	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.05	Piping	0.01	No ground water	1.00
8640:							
Bucyrus-------------	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.05	Hard to pack	0.58	No ground water	1.00
8641:							
Bucyrus-------------	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.05	Hard to pack	0.73	No ground water	1.00

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
8663:							
Clareson	60	Somewhat limited		Somewhat limited		Very limited	
		Depth to bedrock	0.77	Thin layer	0.77	No ground water	1.00
Rock outcrop	20	Very limited		Not rated		Not rated	
		Depth to bedrock	1.00				
8789:							
Lebo	85	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			No ground water	1.00
		Slope	0.21				
		Depth to bedrock	0.02				
8911:							
Summit	85	Not limited		Very limited		Very limited	
				Depth to saturated zone	0.99	No ground water	1.00
				Hard to pack	0.72		
8912:							
Summit	85	Not limited		Very limited		Very limited	
				Depth to saturated zone	0.99	No ground water	1.00
				Hard to pack	0.72		
8953:							
Wagstaff	85	Somewhat limited		Somewhat limited		Very limited	
		Depth to bedrock	0.77	Thin layer	0.77	No ground water	1.00
				Hard to pack	0.36		
8955:							
Wagstaff	85	Somewhat limited		Somewhat limited		Very limited	
		Depth to bedrock	0.77	Thin layer	0.77	No ground water	1.00
				Hard to pack	0.36		
8957:							
Wagstaff	45	Somewhat limited		Somewhat limited		Very limited	
		Depth to bedrock	0.77	Thin layer	0.77	No ground water	1.00
				Hard to pack	0.36		
Summit	35	Not limited		Very limited		Very limited	
				Depth to saturated zone	0.99	No ground water	1.00
				Hard to pack	0.72		
8962:							
Woodson	85	Not limited		Very limited		Very limited	
				Depth to saturated zone	1.00	No ground water	1.00
				Hard to pack	0.43		
9967:							
Arents, landfill	100	Not rated		Not rated		Not rated	
9971:							
Arents, earthen dam	100	Not rated		Not rated		Not rated	
9982:							
Fluvents	100	Not rated		Not rated		Not rated	

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9983:							
Pits, quarries------	100	Not rated		Not rated		Not rated	
9984:							
Made land-----------	100	Not rated		Not rated		Not rated	
9986:							
Miscellaneous water-	100	Not rated		Not rated		Not rated	
9991:							
Orthents------------	100	Not rated		Not rated		Not rated	
9993:							
Pits----------------	100	Not rated		Not rated		Not rated	
9999:							
Water---------------	100	Not rated		Not rated		Not rated	

Table 18.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
4015:												
Chase-----------	0-10	Silt loam, silty clay loam	CL, CH	A-6, A-7	0	0	100	100	95-100	90-100	33-51	12-22
	10-18	Silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	90-100	40-55	19-27
	18-42	Silty clay, silty clay loam, clay	CH, CL	A-7-6	0	0	100	100	95-100	90-100	48-66	25-36
	42-60	Silty clay loam, silty clay	CH, CL	A-7-6	0	0	100	100	95-100	90-100	41-58	21-33
4752:												
Sogn------------	0-13	Silty clay loam	CH, CL	A-6, A-7-6	0	0-10	85-100	70-90	70-85	65-85	39-51	19-25
	13-17	Unweathered bedrock			---	---	---	---	---	---	---	---
Vinland---------	0-8	Silty clay loam, silt loam, channery silty clay loam, channery silt loam	CL, CH	A-7-6, A-6	0	0-5	80-100	60-100	60-99	55-92	33-53	12-25
	8-12	Silty clay loam, silt loam	CL	A-6, A-7-6	0	0	90-100	70-100	68-99	59-86	30-49	12-25
	12-16	Silty clay loam, silt loam	CL	A-6, A-7-6	0	0	90-100	70-100	68-99	59-86	29-47	12-25
	16-20	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
7031:												
Eudora----------	0-7	Silt loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	85-100	70-95	19-33	2-12
	7-14	Silt loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	85-100	80-95	18-33	2-12
	14-40	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	80-95	16-30	2-12
	40-48	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	60-100	16-29	2-12
	48-80	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	65-90	16-29	2-12
7035:												
Eudora----------	0-7	Fine sandy loam, loam	ML, SC, CL, CL-ML, SC-SM, SM	A-4, A-6, A-2-4	0	0	100	95-100	85-95	25-75	18-32	2-12
	7-14	Silt loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	90-100	80-95	18-33	2-12
	14-40	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	80-95	16-30	2-12
	40-48	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	60-100	16-29	2-12
	48-80	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	65-90	16-29	2-12

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
7035:												
Bismarckgrove---	0-6	Fine sandy loam, loam	ML, SC, CL, CL-ML, SC-SM, SM	A-4, A-6, A-2-4	0	0	100	95-100	85-95	25-75	18-32	2-12
	6-14	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	90-100	85-95	32-50	12-25
	14-19	Silt loam, silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	85-95	30-49	12-25
	19-29	Silt loam, silty clay loam	CL	A-7, A-6	0	0	100	100	90-100	80-95	30-49	12-25
	29-44	Very fine sandy loam, silt loam	SC-SM, ML, CL-ML, CL, SC, SM	A-4, A-6, A-2-4	0	0	100	100	60-100	30-90	17-39	2-19
	44-80	Stratified loamy fine sand to fine sandy loam, stratified loamy fine sand to silt loam, stratified loamy fine sand to loam, stratified fine sand to silt loam, stratified fine sand to fine sandy loam, stratified fine sand to loam	SC-SM, ML, CL-ML, CL, SC, SM	A-4, A-6, A-2-4	0	0	100	100	60-100	30-90	16-29	2-12
7036:												
Eudora----------	0-7	Silt loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	85-100	70-95	19-33	2-12
	7-14	Silt loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	85-100	80-95	18-33	2-12
	14-40	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	80-95	16-30	2-12
	40-48	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	60-100	16-29	2-12
	48-80	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	65-90	16-29	2-12

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
7036:												
Bismarckgrove---	0-6	Silt loam, silty clay loam	CL, CH	A-6, A-7	0	0	100	100	95-100	85-95	32-51	12-25
	6-14	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	90-100	85-95	32-50	12-25
	14-19	Silt loam, silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	85-95	30-49	12-25
	19-29	Silt loam, silty clay loam	CL	A-7, A-6	0	0	100	100	90-100	80-95	30-49	12-25
	29-44	Very fine sandy loam, silt loam	SC-SM, ML, CL-ML, CL, SC, SM	A-4, A-6, A-2-4	0	0	100	100	60-100	30-90	17-39	2-19
	44-80	Stratified loamy fine sand to fine sandy loam, stratified loamy fine sand to silt loam, stratified loamy fine sand to loam, stratified fine sand to silt loam, stratified fine sand to fine sandy loam, stratified fine sand to loam	SC-SM, ML, CL-ML, CL, SC, SM	A-4, A-6, A-2-4	0	0	100	100	60-100	30-90	16-29	2-12
7050:												
Kennebec--------	0-8	Silty clay loam, silt loam	CL	A-6	0	0	100	100	95-100	90-100	35-48	13-21
	8-18	Silty clay loam, silt loam	CL	A-6	0	0	100	100	95-100	90-100	35-46	13-21
	18-32	Silty clay loam, silt loam	CL	A-6	0	0	100	100	95-100	90-100	34-45	13-21
	32-41	Silty clay loam, silt loam	CL	A-6	0	0	100	100	95-100	90-100	33-44	13-21
	41-54	Silty clay loam, silt loam	CL	A-6	0	0	100	100	95-100	90-100	32-43	13-21
	54-80	Silt loam, silty clay loam	CL	A-6	0	0	100	100	95-100	90-100	31-42	13-21

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
7051:												
Kennebec--------	0-8	Silty clay loam, silt loam	CL	A-6	0	0	100	100	95-100	90-100	35-48	13-21
	8-18	Silty clay loam, silt loam	CL	A-6	0	0	100	100	95-100	90-100	35-46	13-21
	18-32	Silty clay loam, silt loam	CL	A-6	0	0	100	100	95-100	90-100	34-45	13-21
	32-41	Silty clay loam, silt loam	CL	A-6	0	0	100	100	95-100	90-100	33-44	13-21
	41-54	Silty clay loam, silt loam	CL	A-6	0	0	100	100	95-100	90-100	32-43	13-21
	54-80	Silt loam, silty clay loam	CL	A-6	0	0	100	100	95-100	90-100	31-42	13-21
7055:												
Kimo------------	0-7	Silty clay loam, silty clay	CH	A-7	0	0	100	100	95-100	90-100	50-64	25-32
	7-15	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	95-100	90-100	49-67	25-36
	15-23	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	95-100	90-100	48-65	25-37
	23-27	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	95-100	90-100	47-64	25-37
	27-60	Silt loam, very fine sandy loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	50-100	16-31	2-12
	60-80	Silt loam, very fine sandy loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	50-100	16-30	2-12

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
7089:												
Stonehouse------	0-9	Fine sandy loam, loam	CL, CL-ML, SC-SM, SM, ML, SC	A-4, A-6, A-2-4	0	0	100	95-100	85-95	25-75	18-32	2-12
	9-23	Fine sand, loamy fine sand, loamy sand, sand	SC-SM, SP, SP-SM, SM	A-3, A-2-4	0	0	100	100	50-90	2-35	0-24	NP-6
	23-31	Stratified loamy sand, stratified sand, stratified loamy fine sand, stratified fine sand	SC-SM, SP, SP-SM, SM	A-2-4, A-3	0	0	100	100	50-90	2-35	0-23	NP-6
	31-45	Stratified loamy sand, stratified sand, stratified loamy fine sand, stratified fine sand	SC-SM, SP, SP-SM, SM	A-2-4, A-3	0	0	100	100	50-90	2-35	0-24	NP-6
	45-71	Stratified loamy sand, stratified sand, stratified loamy fine sand, stratified fine sand, stratified sandy loam, stratified fine sandy loam	SC-SM, SM	A-4, A-2-4, A-3	0	0	100	100	60-90	5-40	0-23	NP-6
	71-80	Stratified loamy sand, stratified sand, stratified loamy fine sand, stratified fine sand, stratified sandy loam, stratified fine sandy loam	SC-SM, SM, SP-SM, SP	A-3, A-2-4	0	0	100	100	50-90	2-35	0-22	NP-6

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
7089:												
Eudora----------	0-7	Loam, fine sandy loam	CL, CL-ML, SC-SM, SM, ML, SC	A-2-4, A-4, A-6	0	0	100	95-100	85-95	25-75	18-32	2-12
	7-14	Silt loam, loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	80-95	18-33	2-12
	14-40	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	80-95	16-30	2-12
	40-48	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	60-100	16-29	2-12
	48-80	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	65-90	16-29	2-12
7090:												
Wabash----------	0-5	Silty clay loam	CH, CL	A-7-6	0	0	100	100	100	95-100	43-54	19-25
	5-16	Silty clay loam	CH, CL	A-7-6	0	0	100	100	100	95-100	45-59	21-29
	16-52	Silty clay, clay	CH	A-7-6	0	0	100	100	100	95-100	52-75	29-44
	52-70	Silty clay, clay	CH	A-7-6	0	0	100	100	100	95-100	51-73	29-44
7105:												
Belvue----------	0-6	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	85-100	70-90	17-32	2-12
	6-11	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	85-100	70-90	16-29	2-12
	11-24	Very fine sandy loam, silt loam, loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	85-100	60-90	16-29	2-12
	24-39	Silt loam, very fine sandy loam, loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	85-100	60-90	16-29	2-12
	39-58	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	85-100	60-90	16-29	2-12
	58-80	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	85-100	60-90	16-29	2-12
7106:												
Eudora----------	0-7	Silt loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	85-100	70-95	19-33	2-12
	7-14	Silt loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	85-100	80-95	18-33	2-12
	14-40	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	80-95	16-30	2-12
	40-48	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	60-100	16-29	2-12
	48-80	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	65-90	16-29	2-12

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
7106:												
Bismarckgrove---	0-6	Silt loam, silty clay loam	CL, CH	A-6, A-7	0	0	100	100	95-100	85-95	32-51	12-25
	6-14	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	90-100	85-95	32-50	12-25
	14-19	Silt loam, silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	85-95	30-49	12-25
	19-29	Silt loam, silty clay loam	CL	A-7, A-6	0	0	100	100	90-100	80-95	30-49	12-25
	29-44	Very fine sandy loam, silt loam	SC, SM, SC-SM, ML, CL-ML, CL	A-6, A-2-4, A-4	0	0	100	100	60-100	30-90	17-39	2-19
	44-80	Stratified loamy fine sand to fine sandy loam, stratified loamy fine sand to silt loam, stratified loamy fine sand to loam, stratified fine sand to silt loam, stratified fine sand to fine sandy loam, stratified fine sand to loam	SC, SM, SC-SM, ML, CL-ML, CL	A-2-4, A-4, A-6	0	0	100	100	60-100	30-90	16-29	2-12
7123:												
Eudora----------	0-7	Silt loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	85-100	70-95	19-33	2-12
	7-14	Silt loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	85-100	80-95	18-33	2-12
	14-40	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	80-95	16-30	2-12
	40-48	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	60-100	16-29	2-12
	48-80	Silt loam, very fine sandy loam, loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	65-90	16-29	2-12

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
7155:												
Kimo------------	0-7	Silty clay loam, silty clay	CH	A-7	0	0	100	100	95-100	90-100	50-64	25-32
	7-15	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	95-100	90-100	49-67	25-36
	15-23	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	95-100	90-100	48-65	25-37
	23-27	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	95-100	90-100	47-64	25-37
	27-60	Silt loam, very fine sandy loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	50-100	16-31	2-12
	60-80	Silt loam, very fine sandy loam	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	50-100	16-30	2-12
7170:												
Reading---------	0-10	Silt loam	CL	A-6, A-7-6	0	0	100	100	98-100	90-97	33-48	12-21
	10-15	Silty clay loam, silt loam	CL	A-6, A-7-6	0	0	100	100	98-100	90-97	34-46	13-21
	15-35	Silty clay loam	CL	A-7-6	0	0	100	100	98-100	85-98	42-49	21-25
	35-41	Silty clay loam	CL	A-7-6	0	0	100	100	98-100	85-98	41-48	21-25
	41-60	Silty clay loam, clay loam, silty clay	CL, CH	A-7-6	0	0	100	100	98-100	90-95	41-56	21-33
7251:												
Grundy----------	0-9	Silt loam, silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-49	9-21
	9-15	Silty clay loam, silt loam	CH, CL	A-7-6, A-6	0	0	100	100	95-100	90-100	37-52	16-25
	15-29	Silty clay, silty clay loam	CH	A-7-6	0	0	100	100	95-100	90-100	50-65	27-37
	29-44	Silty clay loam	CL, CH	A-7-6	0	0	100	100	90-100	90-100	41-51	21-27
	44-60	Silty clay loam	CL	A-7-6, A-6	0	0	100	100	90-100	90-100	38-47	19-25
7261:												
Gymer-----------	0-6	Silt loam	CL	A-7, A-6	0	0	100	100	95-100	75-100	35-46	13-19
	6-15	Silt loam, silty clay loam	CL	A-7, A-6	0	0	100	100	95-100	75-100	34-49	13-23
	15-30	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	95-100	85-100	47-57	25-30
	30-80	Silty clay loam	CH, CL	A-6, A-7	0	0	100	100	95-100	85-100	38-50	19-27

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
7285:												
Ladoga----------	0-8	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	70-90	33-47	12-21
	8-13	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	70-90	34-49	13-23
	13-31	Silty clay loam, silty clay	CL, CH	A-7-6	0	0	100	100	90-100	80-90	47-56	25-30
	31-60	Silty clay loam, silt loam	CL	A-6, A-7-6	0	0	100	100	95-100	80-95	35-47	17-25
7286:												
Ladoga----------	0-8	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	70-90	33-47	12-21
	8-13	Silt loam, silty clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	70-90	34-49	13-23
	13-31	Silty clay loam, silty clay	CL, CH	A-7-6	0	0	100	100	90-100	80-90	47-56	25-30
	31-60	Silty clay loam, silt loam	CL	A-6, A-7-6	0	0	100	100	95-100	80-95	35-47	17-25
7302:												
Martin----------	0-9	Silty clay loam, silt loam	CH, CL	A-7-6, A-6	0	0	100	100	93-100	90-98	38-55	17-27
	9-15	Silty clay loam, silty clay	CH, CL	A-7-6	0	0	100	100	93-100	90-98	43-59	21-30
	15-34	Silty clay, clay	CH	A-7-6	0	0	100	100	92-100	90-99	52-69	29-40
	34-60	Silty clay, clay	CH	A-7-6	0	0	100	100	92-100	90-99	52-68	29-41
7330:												
Martin----------	0-9	Silty clay loam, silt loam	CH, CL	A-7-6, A-6	0	0	100	100	93-100	90-98	38-55	17-27
	9-15	Silty clay loam, silty clay	CH, CL	A-7-6	0	0	100	100	93-100	90-98	43-59	21-30
	15-34	Silty clay, clay	CH	A-7-6	0	0	100	100	92-100	90-99	52-69	29-40
	34-60	Silty clay, clay	CH	A-7-6	0	0	100	100	92-100	90-99	52-68	29-41

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
7330:												
Vinland---------	0-4	Channery silty clay loam, silty clay loam	CL, CH	A-7-6	0	0-5	80-100	60-100	60-99	55-92	41-53	19-25
	4-11	Silty clay loam, silt loam	CL	A-6, A-7-6	0	0	90-100	70-100	68-99	59-86	30-49	12-25
	11-18	Silty clay loam, silt loam	CL	A-6, A-7-6	0	0	90-100	70-100	68-99	59-86	29-47	12-25
	18-20	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
7433:												
Morrill---------	0-9	Loam, clay loam	CL, SC	A-4, A-6, A-7-6	0	0	95-100	71-100	63-88	43-67	28-46	9-21
	9-13	Loam, clay loam	CL, SC	A-6, A-7-6	0	0	95-100	71-100	63-88	43-67	30-44	12-21
	13-22	Clay loam, sandy clay loam, gravelly clay loam	CL, SC	A-6, A-7-6	0	0	76-100	60-100	51-91	45-75	36-48	17-25
	22-39	Clay loam, sandy clay loam, gravelly clay loam	CL, SC	A-6, A-7-6	0	0	76-100	60-100	52-91	45-75	36-47	17-25
	39-60	Clay loam, loam, sandy clay loam	CL, SC	A-7-6, A-6	0	0	91-100	65-100	55-85	38-59	30-47	13-25
7460:												
Oska------------	0-9	Silty clay loam	CL, CH	A-7	0	0	100	100	95-100	90-100	42-57	19-29
	9-31	Silty clay, clay, silty clay loam	CH	A-7	0	0	100	100	95-100	95-100	50-74	27-44
	31-38	Silty clay loam, silty clay, clay	CH, CL	A-7	0	0	100	100	95-100	95-100	46-57	25-33
	38-42	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
7462:												
Oska------------	0-8	Silty clay loam	CL, CH	A-7	0	0	100	100	93-100	90-100	42-52	19-25
	8-16	Silty clay, silty clay loam	CL, CH	A-7	0	0	100	100	93-100	90-100	47-64	25-37
	16-32	Clay, silty clay, silty clay loam	CH, CL	A-7	0	0	100	100	97-100	95-99	46-62	25-37
	32-36	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Martin----------	0-9	Silty clay loam	CH, CL	A-7-6	0	0	100	100	93-100	90-98	42-59	19-29
	9-15	Silty clay loam	CH, CL	A-7-6	0	0	100	100	93-100	90-98	42-59	19-29
	15-34	Silty clay, clay	CH	A-7, A-7-6	0	0	100	100	92-100	90-99	52-69	29-40
	34-60	Silty clay, clay	CH	A-7, A-7-6	0	0	100	100	92-100	90-99	51-69	29-40

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
7502:												
Pawnee----------	0-8	Clay loam	CL, CH	A-7-6	0	0	95-100	89-100	78-96	60-75	41-53	19-25
	8-12	Clay loam	CL, CH	A-7-6	0	0	95-100	89-100	78-95	59-74	42-54	21-27
	12-40	Clay, clay loam	CH, CL	A-7-6	0	0	95-100	90-100	79-99	62-80	49-63	27-36
	40-49	Clay loam	CL, CH	A-7-6	0	0	95-100	89-100	77-96	59-76	41-52	21-29
	49-60	Clay loam, sandy clay loam	CL	A-6, A-7-6	0	0	95-100	89-100	74-96	53-73	35-49	17-27
7525:												
Chillicothe-----	0-5	Silt loam, silty clay loam	CL	A-7-6, A-6	0	0	100	100	95-100	90-100	37-48	15-18
	5-13	Silt loam, silty clay loam	CL	A-7-6, A-6	0	0	100	100	95-100	90-100	37-48	15-18
	13-19	Silty clay loam, silt loam	CL	A-7-6, A-6	0	0	100	100	95-100	90-100	37-48	15-18
	19-31	Silty clay loam	CH, CL	A-6, A-7-6	0	0	100	100	95-100	90-100	39-51	19-25
	31-43	Silty clay loam	CH, CL	A-6, A-7-6	0	0	100	100	95-100	90-100	39-51	19-25
	43-48	Silty clay loam, silty clay	CH, CL	A-6, A-7-6	0	0	100	100	95-100	90-100	39-51	19-25
	48-60	Silty clay, silty clay loam	CL, CH	A-7-6	0	0	100	100	95-100	90-100	45-54	24-30
	60-81	Silty clay, silty clay loam	CL, CH	A-7-6	0	0	100	100	95-100	90-100	45-54	24-30
	81-85	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
7535:												
Sharpsburg------	0-9	Silt loam	CL	A-7, A-6	0	0	100	100	100	95-100	33-46	12-19
	9-13	Silty clay loam, silt loam	CH, CL	A-7-6, A-6	0	0	100	100	100	95-100	39-52	17-25
	13-35	Silty clay loam, silty clay	CH, CL	A-7-6	0	0	100	100	100	95-100	49-57	26-30
	35-60	Silty clay loam, silt loam	CL	A-6, A-7-6	0	0	100	100	100	95-100	36-45	17-23
7545:												
Sharpsburg------	0-9	Silt loam	CL	A-7, A-6	0	0	100	100	100	95-100	33-46	12-19
	9-13	Silty clay loam, silt loam	CH, CL	A-7-6, A-6	0	0	100	100	100	95-100	39-52	17-25
	13-35	Silty clay loam, silty clay	CH, CL	A-7-6	0	0	100	100	100	95-100	49-57	26-30
	35-60	Silty clay loam, silt loam	CL	A-6, A-7-6	0	0	100	100	100	95-100	36-45	17-23
Urban land.												

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
7603:												
Sibleyville-----	0-7	Loam	CL, SC	A-4, A-6, A-7	0	0	100	84-100	67-93	45-67	27-46	9-19
	7-15	Loam, clay loam, sandy clay loam	SC, CL	A-6, A-7	0	0	100	84-100	69-97	48-72	32-49	13-25
	15-27	Channery loam, channery clay loam, channery sandy clay loam	CL, SC	A-2, A-4, A-6, A-7	0	0-15	72-91	54-91	43-85	28-60	26-42	9-21
	27-31	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
7607:												
Sibleyville-----	0-8	Loam	CL, SC	A-4, A-6, A-7	0	0	100	84-100	71-96	46-67	28-46	9-19
	8-22	Clay loam, loam, sandy clay loam	CL, SC	A-6, A-7-6	0	0	100	84-100	71-100	49-73	32-49	13-25
	22-29	Clay loam, loam, sandy clay loam	CL, SC	A-6, A-2, A-7-6	0	0-15	72-91	54-91	45-91	30-66	26-44	10-23
	29-33	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
Vinland---------	0-4	Silty clay loam, channery silty clay loam	CL, CH	A-7-6	0	0-4	82-100	59-100	58-100	53-99	41-53	19-25
	4-11	Silty clay loam	CL	A-6, A-7-6	0	0-4	83-100	61-100	58-100	54-96	39-49	19-25
	11-18	Silty clay loam, silt loam	CL, SC	A-7-6, A-6	0	0	82-100	60-100	52-100	47-93	31-47	13-25
	18-22	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
7658:												
Vinland---------	0-4	Silty clay loam, channery silty clay loam	CL, CH	A-7-6	0	0-4	82-100	59-100	58-100	53-99	41-53	19-25
	4-11	Silty clay loam	CL	A-6, A-7-6	0	0-4	83-100	61-100	58-100	54-96	39-49	19-25
	11-17	Silty clay loam, silt loam	CL, SC	A-6, A-7-6	0	0	82-100	60-100	52-100	47-93	31-47	13-25
	17-21	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
7805:												
Arisburg--------	0-9	Silt loam, silty clay loam	CL, CH	A-6, A-7-6	0	0	100	100	95-100	90-99	33-54	12-25
	9-15	Silty clay loam	CL, CH	A-7-6	0	0	100	100	95-100	95-99	40-52	19-25
	15-22	Silty clay	CH, CL	A-7-6	0	0	100	100	95-100	90-99	47-59	25-33
	22-29	Silty clay	CH, CL	A-7-6	0	0	100	100	95-100	90-99	47-63	25-37
	29-44	Silty clay	CH, CL	A-7-6	0	0	100	100	95-100	90-99	46-62	25-37
	44-60	Silty clay loam	CL, CH	A-7-6	0	0	100	100	95-100	90-99	46-52	25-29

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
8101:												
Hepler----------	0-9	Silt loam	CL	A-4, A-6	0	0	100	100	90-100	75-95	28-38	9-16
	9-25	Silt loam	CL	A-6	0	0	100	100	90-100	75-95	26-36	10-16
	25-40	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	38-47	19-25
	40-60	Silty clay loam, silty clay	CL, CH	A-6, A-7	0	0	100	100	95-100	85-95	38-53	19-30
8301:												
Verdigris-------	0-9	Silt loam, silty clay loam	CL	A-7, A-4, A-6	0	0	100	100	95-100	80-100	30-48	9-21
	9-27	Silt loam, silty clay loam	CL	A-4, A-6, A-7	0	0	100	100	95-100	80-100	30-48	9-21
	27-32	Silt loam, silty clay loam	CL	A-4, A-6, A-7	0	0	100	100	95-100	80-100	30-48	9-21
	32-52	Silt loam, silty clay loam	CL	A-6, A-7, A-4	0	0	100	100	95-100	80-100	28-46	9-21
	52-60	Silt loam, silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	80-100	26-42	10-21
8302:												
Verdigris-------	0-9	Silt loam, silty clay loam	CL	A-7, A-4, A-6	0	0	100	100	95-100	80-100	30-48	9-21
	9-27	Silt loam, silty clay loam	CL	A-4, A-6, A-7	0	0	100	100	95-100	80-100	30-48	9-21
	27-32	Silt loam, silty clay loam	CL	A-4, A-6, A-7	0	0	100	100	95-100	80-100	30-48	9-21
	32-52	Silt loam, silty clay loam	CL	A-4, A-6, A-7	0	0	100	100	95-100	80-100	28-46	9-21
	52-60	Silt loam, silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	80-100	26-42	10-21
8390:												
Wynona----------	0-10	Silt loam, silty clay loam	CL, CH	A-7-6, A-6	0	0	100	100	96-100	80-97	36-51	16-25
	10-14	Silt loam, silty clay loam	CL, CH	A-6, A-7-6	0	0	100	100	96-100	80-97	36-51	16-25
	14-38	Silty clay loam	CL	A-6, A-7-6	0	0	100	100	98-100	90-98	38-48	19-25
	38-53	Silty clay loam, silty clay	CL, CH	A-7-6	0	0	100	100	98-100	90-98	41-57	21-33
	53-60	Silty clay loam, silty clay	CL, CH	A-7-6, A-6	0	0	100	100	96-100	80-97	38-61	18-32

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
8501:												
Mason-----------	0-8	Silt loam	CL	A-7, A-6	0	0	100	100	96-100	65-98	32-43	13-19
	8-18	Silt loam, silty clay loam	CL	A-7, A-6	0	0	100	100	96-100	65-98	35-45	16-21
	18-41	Silty clay loam, clay loam, silt loam	CL	A-6, A-7	0	0	98-100	98-100	96-100	65-98	35-47	16-25
	41-60	Silty clay loam, clay loam, silt loam	CL	A-6, A-7	0	0	98-100	98-100	96-100	65-98	33-47	15-25
8640:												
Bucyrus---------	0-8	Silt loam	CL, CH	A-7-6, A-6	0	0	100	100	95-100	85-95	35-51	13-22
	8-16	Silt loam, silty clay loam	CL, CH	A-7-6, A-6	0	0	100	100	95-100	85-95	38-52	16-25
	16-22	Silty clay loam	CL, CH	A-6, A-7-6	0	0	100	100	95-100	85-99	40-50	19-25
	22-32	Silty clay loam, silty clay	CH, CL	A-7-6	0	0	100	100	95-100	90-95	47-69	25-40
	32-52	Silty clay loam, silty clay	CH, CL	A-7-6	0	0	100	100	95-100	90-95	47-69	25-40
	52-71	Silty clay loam, silty clay	CH, CL	A-7-6	0	0	100	100	95-100	90-95	46-72	25-44
	71-75	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
8641:												
Bucyrus---------	0-6	Silt loam, silty clay loam	CL, CH	A-7-6	0	0	100	100	90-100	70-90	39-53	17-25
	6-17	Silty clay loam	CL, CH	A-6, A-7-6	0	0	100	100	95-100	85-99	40-50	19-25
	17-32	Silty clay loam, silty clay	CH, CL	A-7-6	0	0	100	100	95-100	90-95	47-69	25-40
	32-52	Silty clay loam, silty clay	CH, CL	A-7-6	0	0	100	100	95-100	90-95	47-69	25-40
	52-71	Silty clay loam, silty clay	CH, CL	A-7-6	0	0	100	100	95-100	90-95	46-72	25-44
	71-75	Weathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
8663:												
Clareson--------	0-7	Silty clay loam	CL, CH	A-7-6	0	0-22	88-100	75-100	71-100	70-100	42-59	19-29
	7-15	Silty clay loam, flaggy silty clay loam	CL, CH	A-7-6	0	0-30	87-100	74-100	71-100	70-100	42-55	21-29
	15-26	Very flaggy silty clay loam, flaggy silty clay loam, very flaggy silty clay	CH, CL	A-7-6	0	42-60	87-100	74-100	71-100	69-100	42-63	25-36
	26-30	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
8789:												
Lebo------------	0-11	Channery silty clay loam, very channery silty clay loam, silty clay loam, silt loam	CL, SC	A-6, A-7	0	0-4	80-95	47-95	44-95	40-92	37-51	15-25
	11-18	Channery silty clay loam, very channery silty clay loam, silty clay loam, silt loam	CL, SC	A-6, A-7	0	0-4	80-95	47-95	43-95	39-90	34-49	15-25
	18-28	Very channery silty clay loam, channery silty clay loam, silty clay loam, silt loam	CL, SC	A-2-7, A-2-6, A-6, A-7	0	0-17	71-95	28-95	25-95	23-90	33-48	15-25
	28-38	Very channery silty clay loam, very channery silt loam, extremely channery silty clay loam, extremely channery silt loam	SC, CL	A-7, A-6, A-2-6, A-2-7	0	0-2	60-72	5-58	4-58	4-57	33-48	15-25
	38-42	Weathered bedrock	---	---	0	---	---	---	---	---	---	---

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
8911:												
Summit	0-11	Silty clay, silty clay loam	CH, CL	A-7	0	0	90-100	85-100	80-100	70-99	47-64	23-32
	11-24	Silty clay loam, clay, silty clay	CH	A-7	0	0	85-100	75-100	70-100	55-98	51-65	27-37
	24-42	Clay, silty clay	CH	A-7	0	0	85-100	75-100	70-100	55-98	58-73	34-44
	42-60	Clay, silty clay	CH	A-7	0	0	85-100	75-100	70-100	55-98	51-72	29-44
8912:												
Summit	0-11	Silty clay, silty clay loam	CH, CL	A-7	0	0	90-100	85-100	80-100	70-99	47-64	23-32
	11-24	Silty clay loam, clay, silty clay	CH	A-7	0	0	85-100	75-100	70-100	55-98	51-65	27-37
	24-42	Clay, silty clay	CH	A-7	0	0	85-100	75-100	70-100	55-98	58-73	34-44
	42-60	Clay, silty clay	CH	A-7	0	0	85-100	75-100	70-100	55-98	51-72	29-44
8953:												
Wagstaff	0-7	Silt loam, silty clay loam	CL, CH	A-7-6, A-6	0	0	100	100	90-100	70-90	35-51	13-22
	7-14	Silty clay loam, silt loam	CH, CL	A-7-6, A-6	0	0	100	100	95-100	85-90	39-54	16-25
	14-18	Silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	85-90	40-53	19-27
	18-24	Silty clay, silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	90-95	47-73	25-44
	24-33	Silty clay, silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	90-95	47-73	25-44
	33-37	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
8955:												
Wagstaff	0-7	Silty clay loam, silt loam	CL, CH	A-7-6, A-6	0	0	100	100	90-100	70-90	35-51	13-22
	7-14	Silty clay loam, silt loam	CH, CL	A-7-6, A-6	0	0	100	100	95-100	85-90	39-54	16-25
	14-18	Silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	85-90	40-53	19-27
	18-24	Silty clay, silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	90-95	47-73	25-44
	24-33	Silty clay, silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	90-95	47-73	25-44
	33-37	Weathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
8957:												
Wagstaff--------	0-7	Silty clay loam, silt loam	CL, CH	A-7-6, A-6	0	0	100	100	90-100	70-90	35-51	13-22
	7-14	Silty clay loam, silt loam	CH, CL	A-7-6, A-6	0	0	100	100	95-100	85-90	39-54	16-25
	14-18	Silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	85-90	40-53	19-27
	18-24	Silty clay, silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	90-95	47-73	25-44
	24-33	Silty clay, silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	90-95	47-73	25-44
	33-37	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
Summit----------	0-11	Silty clay, silty clay loam	CH, CL	A-7	0	0	90-100	85-100	80-100	70-99	47-64	23-32
	11-24	Silty clay loam, clay, silty clay	CH	A-7	0	0	85-100	75-100	70-100	55-98	51-65	27-37
	24-42	Clay, silty clay	CH	A-7	0	0	85-100	75-100	70-100	55-98	58-73	34-44
	42-60	Clay, silty clay	CH	A-7	0	0	85-100	75-100	70-100	55-98	51-72	29-44
8962:												
Woodson---------	0-7	Silt loam	CL	A-6, A-7-6	0	0	100	100	94-100	91-100	33-46	12-19
	7-12	Silt loam, silty clay loam	CL, CH	A-6, A-7-6	0	0	100	100	94-100	91-100	35-51	13-22
	12-30	Silty clay, clay	CH	A-7-6	0	0	100	94-100	85-100	84-100	52-75	29-44
	30-43	Silty clay, clay	CH	A-7-6	0	0	100	94-100	89-100	88-100	52-74	29-44
	43-60	Silty clay loam, silty clay, clay	CH, CL	A-7-6	0	0	100	94-100	91-100	89-100	46-62	25-37
9967. Arents, landfill												
9971. Arents, earthen dam												
9982. Fluvents												
9983. Pits, quarries												
9984. Made land												
9986. Miscellaneous water												
9991. Orthents												

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
9993. Pits												
9999. Water												

Table 19.--Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
4015:														
Chase------------	0-10	1-10	50-75	18-32	1.30-1.40	4.23-14.11	0.22-0.24	2.4-5.9	2.0-4.0	.37	.37	5	6	48
	10-18	1-10	35-65	27-38	1.35-1.45	0.42-1.41	0.18-0.20	4.6-7.4	1.0-3.0	.28	.28			
	18-42	1-10	35-65	35-50	1.35-1.45	0.42-1.41	0.11-0.19	6.7-10.4	1.0-2.5	.28	.28			
	42-60	1-10	40-60	30-45	1.35-1.45	0.42-1.41	0.11-0.18	5.4-9.2	0.2-1.0	.28	.28			
4752:														
Sogn-------------	0-13	1-20	50-70	27-35	1.15-1.20	4.23-14.11	0.17-0.22	3.0-5.9	1.0-3.0	.32	.32	1	4L	86
	13-17	---	---	---	---	---	---	---	---	---	---			
Vinland----------	0-8	1-20	50-75	18-35	1.20-1.40	4.23-14.11	0.21-0.24	2.2-5.8	2.0-4.0	.32	.32	2	7	38
	8-12	1-55	20-70	18-35	1.30-1.60	4.23-14.11	0.15-0.22	2.2-5.8	1.0-2.0	.43	.49			
	12-16	1-55	20-70	18-35	1.30-1.60	4.23-14.11	0.15-0.22	2.2-5.8	0.2-1.0	.43	.49			
	16-20	---	---	---	---	---	---	---	---	---	---			
7031:														
Eudora-----------	0-7	10-50	40-80	5-18	1.30-1.50	4.23-14.11	0.20-0.24	0.0-2.2	1.5-2.0	.32	.32	5	5	56
	7-14	10-50	40-80	5-18	1.30-1.50	4.23-14.11	0.20-0.24	0.0-2.2	1.0-2.0	.32	.32			
	14-40	10-50	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.2-1.0	.43	.43			
	40-48	10-50	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.5	.43	.43			
	48-80	10-75	40-75	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.2	.43	.43			
7035:														
Eudora-----------	0-7	40-70	20-40	5-18	1.40-1.50	14.00-42.00	0.08-0.18	0.0-2.2	1.0-1.5	.20	.20	5	3	86
	7-14	10-50	40-80	5-18	1.30-1.50	4.23-14.11	0.20-0.24	0.0-2.2	1.0-2.0	.32	.32			
	14-40	10-50	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.2-1.0	.43	.43			
	40-48	10-50	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.5	.43	.43			
	48-80	10-75	40-75	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.2	.43	.43			
Bismarckgrove----	0-6	40-70	20-40	5-18	1.40-1.50	14.00-42.00	0.08-0.18	0.0-2.2	1.0-1.5	.20	.20	5	3	86
	6-14	1-30	50-75	18-35	1.35-1.45	1.41-4.23	0.18-0.21	2.2-5.8	1.5-2.5	.32	.32			
	14-19	1-30	50-75	18-35	1.35-1.40	4.23-14.11	0.17-0.22	2.2-5.8	1.0-2.0	.32	.32			
	19-29	1-30	50-75	18-35	1.35-1.40	4.23-14.11	0.17-0.22	2.2-5.8	1.0-2.0	.32	.32			
	29-44	10-60	40-70	5-27	1.30-1.50	4.23-14.11	0.15-0.19	0.0-4.1	0.3-0.8	.43	.43			
	44-80	10-90	8-60	5-18	1.30-1.50	4.23-14.11	0.15-0.19	0.0-2.2	0.1-0.5	.43	.43			
7036:														
Eudora-----------	0-7	10-50	40-80	5-18	1.30-1.50	4.23-14.11	0.20-0.24	0.0-2.2	1.5-2.0	.32	.32	5	5	56
	7-14	10-50	40-80	5-18	1.30-1.50	4.23-14.11	0.20-0.24	0.0-2.2	1.0-2.0	.32	.32			
	14-40	10-50	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.2-1.0	.43	.43			
	40-48	10-50	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.5	.43	.43			
	48-80	10-75	40-75	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.2	.43	.43			
Bismarckgrove----	0-6	1-30	50-75	18-35	1.30-1.45	4.23-14.11	0.21-0.23	2.2-5.8	1.5-3.0	.32	.32	5	7	38
	6-14	1-30	50-75	18-35	1.35-1.45	1.41-4.23	0.18-0.21	2.2-5.8	1.5-2.5	.32	.32			
	14-19	1-30	50-75	18-35	1.35-1.40	4.23-14.11	0.17-0.22	2.2-5.8	1.0-2.0	.32	.32			
	19-29	1-30	50-75	18-35	1.35-1.40	4.23-14.11	0.17-0.22	2.2-5.8	1.0-2.0	.32	.32			
	29-44	10-60	40-70	5-27	1.30-1.50	4.23-14.11	0.15-0.19	0.0-4.1	0.3-0.8	.43	.43			
	44-80	10-90	8-60	5-18	1.30-1.50	4.23-14.11	0.15-0.19	0.0-2.2	0.1-0.5	.43	.43			
7050:														
Kennebec---------	0-8	0-10	65-75	20-30	1.25-1.35	4.23-14.11	0.22-0.24	2.6-4.7	2.0-4.0	.28	.28	5	6	48
	8-18	0-10	65-75	20-30	1.25-1.35	4.23-14.11	0.22-0.24	2.6-4.7	2.0-3.0	.28	.28			
	18-32	0-10	65-75	20-30	1.25-1.35	4.23-14.11	0.22-0.24	2.6-4.7	1.5-2.5	.28	.28			
	32-41	0-10	65-75	20-30	1.25-1.35	4.23-14.11	0.22-0.24	2.6-4.7	1.2-2.0	.28	.28			
	41-54	0-10	65-75	20-30	1.25-1.35	4.23-14.11	0.22-0.24	2.6-4.7	1.0-1.5	.43	.43			
	54-80	0-10	65-75	20-30	1.35-1.40	4.23-14.11	0.20-0.22	2.6-4.7	0.5-1.0	.43	.43			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors Kw	Kf	T	Wind erodibility group	Wind erodibility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
7051:														
Kennebec---------	0-8	0-10	65-75	20-30	1.25-1.35	4.23-14.11	0.22-0.24	2.6-4.7	2.0-4.0	.28	.28	5	6	48
	8-18	0-10	65-75	20-30	1.25-1.35	4.23-14.11	0.22-0.24	2.6-4.7	2.0-3.0	.28	.28			
	18-32	0-10	65-75	20-30	1.25-1.35	4.23-14.11	0.22-0.24	2.6-4.7	1.5-2.5	.28	.28			
	32-41	0-10	65-75	20-30	1.25-1.35	4.23-14.11	0.22-0.24	2.6-4.7	1.2-2.0	.28	.28			
	41-54	0-10	65-75	20-30	1.25-1.35	4.23-14.11	0.22-0.24	2.6-4.7	1.0-1.5	.43	.43			
	54-80	0-10	65-75	20-30	1.35-1.40	4.23-14.11	0.20-0.22	2.6-4.7	0.5-1.0	.43	.43			
7055:														
Kimo-------------	0-7	1-10	40-60	35-45	1.20-1.30	0.42-1.41	0.13-0.22	6.7-9.2	2.0-4.0	.37	.37	5	4	86
	7-15	1-10	40-60	35-50	1.20-1.30	0.42-1.41	0.13-0.22	6.7-10.4	1.5-3.0	.37	.37			
	15-23	1-10	40-60	35-50	1.20-1.30	0.42-1.41	0.13-0.22	6.7-10.4	1.0-2.0	.37	.37			
	23-27	1-10	40-60	35-50	1.20-1.30	0.42-1.41	0.13-0.22	6.7-10.4	0.5-1.5	.37	.37			
	27-60	10-70	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.4	0.1-1.0	.17	.17			
	60-80	10-70	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.4	0.1-0.5	.17	.17			
7089:														
Stonehouse-------	0-9	40-70	20-40	5-18	1.40-1.50	14.00-42.00	0.08-0.18	0.0-2.2	1.0-1.5	.20	.20	5	1	220
	9-23	70-95	1-20	1-10	1.40-1.60	42.00-141.00	0.05-0.09	0.0-0.5	0.1-0.8	.15	.15			
	23-31	70-95	1-20	1-10	1.40-1.60	42.00-141.00	0.05-0.09	0.0-0.5	0.1-0.5	.15	.15			
	31-45	70-95	1-20	1-10	1.40-1.60	42.00-141.00	0.05-0.09	0.0-0.5	0.1-0.3	.15	.15			
	45-71	70-95	1-20	1-10	1.40-1.60	14.00-42.00	0.11-0.13	0.0-0.5	0.1-0.8	.20	.20			
	71-80	70-98	1-20	1-10	1.40-1.60	42.00-141.00	0.05-0.09	0.0-0.5	0.1-0.2	.15	.15			
Eudora-----------	0-7	40-70	20-40	5-18	1.40-1.50	14.00-42.00	0.08-0.18	0.0-2.2	1.0-1.5	.20	.20	5	3	86
	7-14	10-50	40-80	5-18	1.30-1.50	4.23-14.11	0.20-0.24	0.0-2.2	1.0-2.0	.32	.32			
	14-40	10-50	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.2-1.0	.43	.43			
	40-48	10-50	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.5	.43	.43			
	48-80	10-75	40-75	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.2	.43	.43			
7090:														
Wabash-----------	0-5	1-10	50-70	27-35	1.35-1.50	0.42-1.41	0.21-0.24	4.6-6.7	2.5-4.0	.37	.37	5	7	38
	5-16	1-10	50-70	30-40	1.35-1.50	0.42-1.41	0.21-0.24	5.4-7.9	2.0-4.0	.37	.37			
	16-52	1-10	30-60	40-60	1.20-1.45	0.01-0.42	0.08-0.12	7.9-12.9	0.5-2.0	.28	.28			
	52-70	1-10	30-60	40-60	1.20-1.45	0.01-0.42	0.08-0.12	7.9-12.9	0.2-1.0	.28	.28			
7105:														
Belvue-----------	0-6	10-60	20-70	5-18	1.30-1.50	4.23-14.11	0.20-0.24	0.0-2.2	0.5-1.5	.32	.32	5	5	56
	6-11	10-60	20-70	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.2-0.5	.43	.43			
	11-24	10-60	20-70	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.3	.43	.43			
	24-39	10-60	20-70	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.2	.43	.43			
	39-58	10-60	20-70	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.3	.43	.43			
	58-80	10-60	20-70	5-18	1.30-1.50	4.23-14.11	0.15-0.19	0.0-2.2	0.1-0.1	.43	.43			
7106:														
Eudora-----------	0-7	10-50	40-80	5-18	1.30-1.50	4.23-14.11	0.20-0.24	0.0-2.2	1.5-2.0	.32	.32	5	5	56
	7-14	10-50	40-80	5-18	1.30-1.50	4.23-14.11	0.20-0.24	0.0-2.2	1.0-2.0	.32	.32			
	14-40	10-50	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.2-1.0	.43	.43			
	40-48	10-50	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.5	.43	.43			
	48-80	10-75	40-75	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.2	.43	.43			
Bismarckgrove----	0-6	1-30	50-75	18-35	1.30-1.45	4.23-14.11	0.21-0.23	2.2-5.8	1.5-3.0	.32	.32	5	7	38
	6-14	1-30	50-75	18-35	1.35-1.45	1.41-4.23	0.18-0.21	2.2-5.8	1.5-2.5	.32	.32			
	14-19	1-30	50-75	18-35	1.35-1.40	4.23-14.11	0.17-0.22	2.2-5.8	1.0-2.0	.32	.32			
	19-29	1-30	50-75	18-35	1.35-1.40	4.23-14.11	0.17-0.22	2.2-5.8	1.0-2.0	.32	.32			
	29-44	10-60	40-70	5-27	1.30-1.50	4.23-14.11	0.15-0.19	0.0-4.1	0.3-0.8	.43	.43			
	44-80	10-90	8-60	5-18	1.30-1.50	4.23-14.11	0.15-0.19	0.0-2.2	0.1-0.5	.43	.43			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
7123:														
Eudora-----------	0-7	10-50	40-80	5-18	1.30-1.50	4.23-14.11	0.20-0.24	0.0-2.2	1.5-2.0	.32	.32	5	5	56
	7-14	10-50	40-80	5-18	1.30-1.50	4.23-14.11	0.20-0.24	0.0-2.2	1.0-2.0	.32	.32			
	14-40	10-50	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.2-1.0	.43	.43			
	40-48	10-50	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.5	.43	.43			
	48-80	10-75	40-75	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.2	0.1-0.2	.43	.43			
7155:														
Kimo-------------	0-7	1-10	40-60	35-45	1.20-1.30	0.42-1.41	0.13-0.22	6.7-9.2	2.0-4.0	.37	.37	5	4	86
	7-15	1-10	40-60	35-50	1.20-1.30	0.42-1.41	0.13-0.22	6.7-10.4	1.5-3.0	.37	.37			
	15-23	1-10	40-60	35-50	1.20-1.30	0.42-1.41	0.13-0.22	6.7-10.4	1.0-2.0	.37	.37			
	23-27	1-10	40-60	35-50	1.20-1.30	0.42-1.41	0.13-0.22	6.7-10.4	0.5-1.5	.37	.37			
	27-60	10-70	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.4	0.1-1.0	.17	.17			
	60-80	10-70	40-85	5-18	1.30-1.50	4.23-14.11	0.17-0.22	0.0-2.4	0.1-0.5	.17	.17			
7170:														
Reading----------	0-10	1-10	50-75	18-30	1.35-1.40	4.23-14.11	0.22-0.24	2.2-4.1	2.0-4.0	.32	.32	5	6	48
	10-15	1-10	50-75	20-30	1.35-1.40	4.23-14.11	0.22-0.24	2.2-4.1	2.0-3.0	.32	.32			
	15-35	1-10	45-70	30-35	1.40-1.50	1.41-14.11	0.18-0.20	4.7-5.8	1.0-2.0	.43	.43			
	35-41	1-10	45-70	30-35	1.40-1.50	1.41-14.11	0.18-0.20	4.7-5.8	0.5-1.5	.43	.43			
	41-60	1-30	40-60	30-45	1.40-1.50	1.41-14.11	0.13-0.20	4.7-7.9	0.2-0.8	.43	.43			
7251:														
Grundy-----------	0-9	1-8	70-80	15-30	1.35-1.50	4.23-14.11	0.22-0.24	1.6-5.4	2.0-4.0	.37	.37	5	6	48
	9-15	1-8	40-70	23-35	1.35-1.45	1.41-4.23	0.18-0.20	3.6-6.7	1.5-3.0	.37	.37			
	15-29	1-8	40-60	38-50	1.30-1.40	0.42-1.41	0.11-0.13	7.4-10.4	0.5-2.0	.37	.37			
	29-44	1-8	60-70	30-38	1.35-1.40	0.42-1.41	0.18-0.20	5.4-7.4	0.2-1.0	.37	.37			
	44-60	1-8	60-70	27-35	1.35-1.40	0.42-1.41	0.18-0.20	4.6-6.7	0.1-0.5	.37	.37			
7261:														
Gymer------------	0-6	1-20	50-75	20-27	1.30-1.40	4.23-14.11	0.22-0.24	2.9-4.5	2.0-4.0	.32	.32	5	6	48
	6-15	1-20	50-75	20-32	1.30-1.40	4.23-14.11	0.22-0.24	2.9-5.9	1.5-3.0	.32	.32			
	15-30	1-20	50-70	35-42	1.40-1.50	1.41-4.23	0.12-0.20	6.7-8.4	0.8-2.0	.43	.43			
	30-80	1-20	50-70	27-38	1.30-1.40	4.23-14.11	0.18-0.20	4.6-7.4	0.2-0.9	.43	.43			
7285:														
Ladoga-----------	0-8	---	---	18-30	1.30-1.35	4.23-14.11	0.22-0.24	2.4-5.4	2.0-3.0	.32	.32	5	6	48
	8-13	---	---	20-32	1.30-1.35	4.23-14.11	0.22-0.24	2.9-5.9	1.5-3.0	.32	.32			
	13-31	---	---	35-42	1.30-1.40	1.41-4.23	0.18-0.20	6.7-8.4	0.5-1.5	.43	.43			
	31-60	---	---	24-35	1.35-1.45	4.23-14.11	0.18-0.20	3.9-6.7	0.2-0.8	.43	.43			
7286:														
Ladoga-----------	0-8	---	---	18-30	1.30-1.35	4.23-14.11	0.22-0.24	2.4-5.4	2.0-3.0	.32	.32	5	6	48
	8-13	---	---	20-32	1.30-1.35	4.23-14.11	0.22-0.24	2.9-5.9	1.5-3.0	.32	.32			
	13-31	---	---	35-42	1.30-1.40	1.41-4.23	0.18-0.20	6.7-8.4	0.5-1.5	.43	.43			
	31-60	---	---	24-35	1.35-1.45	4.23-14.11	0.18-0.20	3.9-6.7	0.2-0.8	.43	.43			
7302:														
Martin-----------	0-9	1-10	50-70	25-38	1.35-1.40	1.41-4.23	0.21-0.23	4.1-7.4	1.0-3.0	.37	.37	5	7	38
	9-15	1-10	50-70	30-42	1.35-1.40	1.41-4.23	0.21-0.23	5.4-8.4	1.0-3.0	.37	.37			
	15-34	1-10	30-60	40-55	1.40-1.50	0.42-1.41	0.12-0.18	7.9-11.6	0.5-1.5	.37	.37			
	34-60	1-10	30-60	40-55	1.40-1.50	0.42-1.41	0.12-0.18	7.9-11.6	0.5-1.0	.37	.37			
7330:														
Martin-----------	0-9	1-10	50-70	25-38	1.35-1.40	1.41-4.23	0.21-0.23	4.1-7.4	1.0-3.0	.37	.37	5	7	38
	9-15	1-10	50-70	30-42	1.35-1.40	1.41-4.23	0.21-0.23	5.4-8.4	1.0-3.0	.37	.37			
	15-34	1-10	30-60	40-55	1.40-1.50	0.42-1.41	0.12-0.18	7.9-11.6	0.5-1.5	.37	.37			
	34-60	1-10	30-60	40-55	1.40-1.50	0.42-1.41	0.12-0.18	7.9-11.6	0.5-1.0	.37	.37			
Vinland----------	0-4	1-20	50-75	27-35	1.20-1.40	4.23-14.11	0.21-0.24	4.1-5.8	2.0-4.0	.32	.32	2	7	38
	4-11	1-55	20-70	18-35	1.30-1.60	4.23-14.11	0.18-0.22	2.2-5.8	1.0-2.0	.43	.49			
	11-18	1-55	20-70	18-35	1.30-1.60	4.23-14.11	0.18-0.22	2.2-5.8	0.2-1.0	.43	.49			
	18-20	---	---	---	---	---	---	---	---	---	---			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
7433:														
Morrill----------	0-9	20-45	15-52	15-30	1.30-1.40	4.23-14.11	0.14-0.21	1.6-4.7	1.0-3.0	.28	.28	5	6	48
	9-13	20-45	15-52	18-30	1.30-1.40	4.23-14.11	0.14-0.21	2.2-4.7	1.0-2.0	.28	.28			
	13-22	20-50	15-52	25-35	1.35-1.45	1.41-4.23	0.15-0.19	3.7-5.8	0.5-1.5	.28	.32			
	22-39	20-50	15-52	25-35	1.35-1.45	1.41-4.23	0.15-0.19	3.7-5.8	0.2-0.8	.28	.32			
	39-60	20-50	15-50	20-35	1.40-1.55	1.41-14.11	0.15-0.18	2.6-5.8	0.1-0.8	.37	.43			
7460:														
Oska-------------	0-9	1-10	50-75	27-40	1.30-1.40	1.41-4.23	0.18-0.20	4.6-7.9	2.0-3.0	.37	.37	2	7	38
	9-31	1-10	30-60	38-60	1.35-1.45	0.42-1.41	0.14-0.18	7.4-12.0	0.5-2.0	.37	.37			
	31-38	1-10	30-60	35-45	1.35-1.45	0.42-1.41	0.14-0.18	6.7-9.2	0.2-0.8	.37	.37			
	38-42	---	---	---	---	---	---	---	---	---	---			
7462:														
Oska-------------	0-8	1-10	50-75	27-35	1.30-1.40	1.41-4.23	0.18-0.20	4.6-6.7	2.0-3.0	.37	.37	2	7	38
	8-16	1-10	50-75	35-50	1.30-1.40	1.41-4.23	0.18-0.20	6.7-10.4	0.5-1.5	.37	.37			
	16-32	1-10	30-60	35-50	1.35-1.45	0.42-1.41	0.14-0.18	6.7-10.4	0.2-0.8	.37	.37			
	32-36	---	---	---	---	---	---	---	---	---	---			
Martin-----------	0-9	1-10	50-70	27-40	1.35-1.40	1.41-4.23	0.21-0.23	4.6-7.9	2.0-4.0	.37	.37	5	7	38
	9-15	1-10	50-70	27-40	1.35-1.40	1.41-4.23	0.21-0.23	4.6-7.9	2.0-4.0	.37	.37			
	15-34	1-10	30-60	40-55	1.40-1.50	0.42-1.41	0.12-0.18	7.9-11.7	0.5-1.5	.37	.37			
	34-60	1-10	30-60	40-55	1.40-1.50	0.42-1.41	0.12-0.18	7.9-11.7	0.2-1.5	.37	.37			
7502:														
Pawnee-----------	0-8	20-45	20-50	27-35	1.40-1.50	1.41-4.23	0.17-0.19	4.1-5.8	2.0-4.0	.37	.37	5	6	48
	8-12	20-45	20-50	30-38	1.40-1.50	1.41-4.23	0.17-0.19	4.7-6.4	1.0-3.0	.37	.37			
	12-40	15-40	15-40	38-50	1.50-1.70	0.42-1.41	0.09-0.11	6.4-8.9	0.5-1.5	.37	.37			
	40-49	20-45	20-50	30-40	1.40-1.50	0.42-1.41	0.14-0.16	4.7-6.8	0.5-1.0	.37	.37			
	49-60	20-55	20-50	25-38	1.40-1.50	0.42-1.41	0.14-0.16	3.7-5.8	0.1-0.5	.37	.37			
7525:														
Chillicothe------	0-5	0-10	60-75	20-35	1.10-1.40	4.23-14.11	0.22-0.24	3.0-4.1	2.0-5.0	.32	.32	5	6	48
	5-13	0-10	60-75	20-35	1.10-1.40	4.23-14.11	0.22-0.24	3.0-4.1	2.0-4.0	.32	.32			
	13-19	0-10	55-70	25-40	1.20-1.40	4.23-14.11	0.22-0.24	3.0-4.1	2.0-3.0	.32	.32			
	19-31	0-10	55-70	30-40	1.20-1.40	4.23-14.11	0.18-0.20	4.1-5.8	1.0-2.0	.32	.32			
	31-43	0-10	55-65	35-40	1.20-1.40	4.23-14.11	0.18-0.20	4.1-5.8	0.6-1.5	.32	.32			
	43-48	0-10	55-65	35-42	1.20-1.40	4.23-14.11	0.18-0.20	4.1-5.8	0.4-1.0	.32	.32			
	48-60	0-10	40-65	35-55	1.30-1.50	4.23-14.11	0.12-0.18	5.6-7.2	0.3-0.8	.32	.32			
	60-81	0-10	35-60	35-60	1.30-1.50	4.23-14.11	0.12-0.18	5.6-7.2	0.2-0.8	.32	.32			
	81-85	---	---	---	---	---	---	---	---	---	---			
7535:														
Sharpsburg-------	0-9	1-10	50-75	18-30	1.30-1.35	4.23-14.11	0.21-0.23	2.4-4.6	2.0-4.0	.32	.32	5	6	48
	9-13	1-10	40-75	25-35	1.35-1.40	4.23-14.11	0.18-0.20	4.1-6.7	1.5-3.0	.43	.43			
	13-35	1-10	40-65	35-42	1.35-1.40	1.41-4.23	0.18-0.20	6.9-8.4	1.0-2.0	.43	.43			
	35-60	1-10	50-70	25-35	1.40-1.45	4.23-14.11	0.18-0.20	4.1-5.9	0.1-1.0	.43	.43			
7545:														
Sharpsburg-------	0-9	1-10	50-75	18-30	1.30-1.35	4.23-14.11	0.21-0.23	2.4-4.6	2.0-4.0	.32	.32	5	6	48
	9-13	1-10	40-75	25-35	1.35-1.40	4.23-14.11	0.18-0.20	4.1-6.7	1.5-3.0	.43	.43			
	13-35	1-10	40-65	35-42	1.35-1.40	1.41-4.23	0.18-0.20	6.9-8.4	1.0-2.0	.43	.43			
	35-60	1-10	50-70	25-35	1.40-1.45	4.23-14.11	0.18-0.20	4.1-5.9	0.1-1.0	.43	.43			
Urban land-------	---	---	---	---	---	---	---	---	---	---	---	--	---	---
7603:														
Sibleyville------	0-7	30-55	20-50	14-27	1.30-1.40	4.23-14.11	0.18-0.21	1.4-4.1	1.0-4.0	.28	.28	3	6	48
	7-15	25-52	20-50	20-35	1.35-1.45	4.23-14.11	0.16-0.19	2.6-5.8	1.0-2.0	.28	.32			
	15-27	25-60	15-50	14-30	1.35-1.50	4.23-14.11	0.12-0.15	1.4-4.7	0.5-1.0	.20	.32			
	27-31	---	---	---	---	---	---	---	---	---	---			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
7607:														
Sibleyville------	0-8	30-55	20-50	15-27	1.30-1.40	4.23-14.11	0.18-0.21	1.6-4.1	1.0-4.0	.28	.28	3	6	48
	8-22	25-52	20-50	20-35	1.35-1.45	4.23-14.11	0.16-0.19	2.6-5.8	1.0-2.0	.28	.32			
	22-29	25-60	15-50	15-32	1.35-1.50	4.23-14.11	0.12-0.15	1.6-5.1	0.2-0.8	.20	.32			
	29-33	---	---	---	---	---	---	---	---	---	---			
Vinland----------	0-4	1-20	50-75	27-35	1.20-1.40	4.23-14.11	0.21-0.24	4.1-5.8	2.0-4.0	.32	.32	2	6	48
	4-11	1-55	20-70	27-35	1.30-1.60	4.23-14.11	0.15-0.22	4.1-5.8	1.0-2.0	.32	.32			
	11-18	1-20	50-75	20-35	1.20-1.40	4.23-14.11	0.21-0.24	2.6-5.8	0.2-0.8	.43	.49			
	18-22	---	---	---	---	---	---	---	---	---	---			
7658:														
Vinland----------	0-4	1-20	50-75	27-35	1.20-1.40	4.23-14.11	0.21-0.24	4.1-5.8	2.0-4.0	.32	.32	2	7	38
	4-11	1-55	20-70	27-35	1.30-1.60	4.23-14.11	0.15-0.22	4.1-5.8	1.0-2.0	.32	.32			
	11-17	1-20	50-75	20-35	1.20-1.40	4.23-14.11	0.21-0.24	2.6-5.8	0.2-0.8	.43	.49			
	17-21	---	---	---	---	---	---	---	---	---	---			
Rock outcrop.														
7805:														
Arisburg---------	0-9	1-10	50-75	18-35	1.30-1.45	4.23-14.11	0.21-0.23	2.4-6.7	2.0-4.0	.32	.32	5	6	48
	9-15	1-10	45-65	27-35	1.30-1.45	1.41-4.23	0.18-0.20	4.6-6.7	1.0-3.0	.32	.32			
	15-22	1-10	40-60	35-45	1.40-1.45	1.41-4.23	0.14-0.18	6.7-9.2	0.8-1.5	.37	.37			
	22-29	1-10	40-60	35-50	1.40-1.50	1.41-4.23	0.16-0.18	6.7-10.4	0.5-1.0	.43	.43			
	29-44	1-10	40-60	35-50	1.40-1.50	1.41-4.23	0.16-0.18	6.7-10.4	0.2-0.8	.43	.43			
	44-60	1-10	45-65	35-40	1.40-1.50	1.41-4.23	0.16-0.18	6.7-7.9	0.1-0.5	.43	.43			
8101:														
Hepler-----------	0-9	1-20	50-75	15-24	1.25-1.35	4.23-14.11	0.22-0.24	1.6-3.5	1.0-2.0	.37	.37	5	6	48
	9-25	1-20	50-75	15-24	1.25-1.35	4.23-14.11	0.22-0.24	1.6-3.5	0.5-1.0	.37	.37			
	25-40	1-20	45-65	27-35	1.35-1.45	4.23-14.11	0.18-0.20	4.1-5.8	0.2-0.8	.37	.37			
	40-60	1-20	40-65	27-42	1.35-1.45	1.41-4.23	0.14-0.17	4.1-7.2	0.2-0.6	.37	.37			
8301:														
Verdigris--------	0-9	1-20	50-75	15-30	1.30-1.40	4.23-14.11	0.20-0.24	1.6-4.7	2.0-4.0	.32	.32	5	6	48
	9-27	1-20	50-75	15-30	1.30-1.40	4.23-14.11	0.17-0.22	1.6-4.7	2.0-4.0	.32	.32			
	27-32	1-20	45-70	15-30	1.40-1.60	4.23-14.11	0.17-0.22	1.6-4.7	2.0-4.0	.32	.32			
	32-52	1-20	45-70	15-30	1.40-1.65	4.23-14.11	0.17-0.22	1.6-4.7	1.0-3.0	.32	.32			
	52-60	1-20	45-70	15-30	1.40-1.65	4.23-14.11	0.17-0.22	1.6-4.7	0.2-1.0	.32	.32			
8302:														
Verdigris--------	0-9	1-20	50-75	15-30	1.30-1.40	4.23-14.11	0.20-0.24	1.6-4.7	2.0-4.0	.32	.32	5	6	48
	9-27	1-20	50-75	15-30	1.30-1.40	4.23-14.11	0.17-0.22	1.6-4.7	2.0-4.0	.32	.32			
	27-32	1-20	45-70	15-30	1.40-1.60	4.23-14.11	0.17-0.22	1.6-4.7	2.0-4.0	.32	.32			
	32-52	1-20	45-70	15-30	1.40-1.65	4.23-14.11	0.17-0.22	1.6-4.7	1.0-3.0	.32	.32			
	52-60	1-20	45-70	15-30	1.40-1.65	4.23-14.11	0.17-0.22	1.6-4.7	0.2-1.0	.32	.32			
8390:														
Wynona-----------	0-10	1-20	50-75	24-35	1.30-1.50	4.23-14.11	0.18-0.22	3.5-5.8	1.0-3.0	.43	.43	5	6	48
	10-14	1-20	50-70	24-35	1.30-1.50	4.23-14.11	0.18-0.22	3.5-5.8	1.0-3.0	.43	.43			
	14-38	1-20	45-65	27-35	1.30-1.50	1.41-4.23	0.18-0.22	4.1-5.8	0.5-1.5	.37	.37			
	38-53	1-20	40-65	30-45	1.35-1.65	0.42-1.41	0.14-0.20	4.7-7.9	0.5-1.0	.37	.37			
	53-60	1-20	50-70	26-45	1.30-1.50	4.23-14.11	0.18-0.22	3.9-7.9	1.0-3.0	.43	.43			
8501:														
Mason------------	0-8	1-10	50-80	20-27	1.30-1.50	4.23-14.11	0.16-0.20	2.6-4.1	1.0-3.0	.37	.37	5	5	56
	8-18	1-10	50-80	23-30	1.30-1.50	4.23-14.11	0.16-0.20	3.3-4.7	0.8-2.5	.37	.37			
	18-41	1-25	45-70	24-35	1.40-1.70	1.41-4.23	0.16-0.20	3.5-5.8	0.5-1.0	.37	.37			
	41-60	1-25	45-70	22-35	1.40-1.70	1.41-4.23	0.16-0.20	3.0-5.8	0.2-0.8	.37	.37			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
8640:														
Bucyrus----------	0-8	1-15	50-75	20-32	1.30-1.55	4.23-14.11	0.22-0.24	2.9-5.9	2.0-4.0	.37	.37	5	6	48
	8-16	1-15	50-70	24-35	1.40-1.60	4.23-14.11	0.18-0.20	3.9-6.7	1.5-3.0	.37	.37			
	16-22	1-10	45-65	27-35	1.45-1.60	1.41-4.23	0.18-0.20	4.6-6.7	1.0-2.0	.32	.32			
	22-32	1-10	40-55	35-55	1.35-1.65	1.41-4.23	0.11-0.20	6.7-11.7	0.8-1.8	.32	.32			
	32-52	1-10	30-55	35-55	1.35-1.65	0.42-1.41	0.12-0.20	6.7-11.7	0.5-1.5	.32	.32			
	52-71	1-10	30-55	35-60	1.35-1.65	0.42-1.41	0.12-0.20	6.7-12.9	0.3-0.8	.32	.32			
	71-75	---	---	---	---	---	---	---	---	---	---			
8641:														
Bucyrus----------	0-6	1-15	50-70	25-35	1.30-1.55	4.23-14.11	0.22-0.24	4.1-6.7	1.5-3.5	.37	.37	5	7	38
	6-17	1-10	45-65	27-35	1.45-1.60	1.41-4.23	0.18-0.20	4.6-6.7	1.0-2.0	.32	.32			
	17-32	1-10	40-55	35-55	1.35-1.65	1.41-4.23	0.11-0.20	6.7-11.7	0.7-1.8	.32	.32			
	32-52	1-10	30-55	35-55	1.35-1.65	0.42-1.41	0.12-0.20	6.7-11.7	0.5-1.5	.32	.32			
	52-71	1-10	30-55	35-60	1.35-1.65	0.42-1.41	0.12-0.20	6.7-12.9	0.3-0.7	.32	.32			
	71-75	---	---	---	---	---	---	---	---	---	---			
8663:														
Clareson---------	0-7	1-10	50-70	27-40	1.25-1.35	4.23-14.11	0.12-0.22	4.1-7.9	2.5-4.0	.24	.32	2	7	38
	7-15	1-10	50-70	30-40	1.30-1.40	1.41-14.11	0.09-0.21	4.7-7.9	1.0-2.0	.24	.43			
	15-26	1-10	40-60	35-50	1.35-1.45	0.42-1.41	0.04-0.07	5.8-8.9	0.5-1.5	.24	.64			
	26-30	---	---	---	---	---	---	---	---	---	---			
Rock outcrop-----	0-60	---	---	---	---	---	0.00-0.00	---	---	---	---	--	8	0
8789:														
Lebo-------------	0-11	5-20	50-60	22-35	1.40-1.50	4.23-14.11	0.10-0.18	3.0-5.8	2.0-3.0	.24	.37	3	8	0
	11-18	5-20	50-60	22-35	1.40-1.50	4.23-14.11	0.10-0.18	3.0-5.8	1.0-2.0	.24	.37			
	18-28	5-20	50-60	22-35	1.40-1.50	4.23-14.11	0.08-0.18	3.0-5.8	0.5-1.5	.24	.37			
	28-38	1-15	50-70	22-35	1.45-1.65	4.23-14.11	0.07-0.10	3.0-5.8	0.2-1.5	.24	.64			
	38-42	---	---	---	---	---	---	---	---	---	---			
8911:														
Summit-----------	0-11	1-15	50-65	32-45	1.25-1.50	1.41-4.23	0.16-0.20	5.9-9.2	2.0-4.0	.37	.37	5	4	86
	11-24	1-10	35-60	38-50	1.35-1.60	0.42-1.41	0.10-0.18	7.4-10.4	1.0-2.0	.32	.32			
	24-42	1-10	35-60	46-60	1.35-1.60	0.42-1.41	0.10-0.18	9.4-12.9	0.5-1.0	.32	.32			
	42-60	1-10	30-65	40-60	1.35-1.60	0.01-0.42	0.10-0.18	7.9-12.9	0.2-0.8	.32	.32			
8912:														
Summit-----------	0-11	1-15	50-65	32-45	1.25-1.50	1.41-4.23	0.16-0.20	5.9-9.2	2.0-4.0	.37	.37	5	4	86
	11-24	1-10	35-60	38-50	1.35-1.60	0.42-1.41	0.10-0.18	7.4-10.4	1.0-2.0	.32	.32			
	24-42	1-10	35-60	46-60	1.35-1.60	0.42-1.41	0.10-0.18	9.4-12.9	0.5-1.0	.32	.32			
	42-60	1-10	30-65	40-60	1.35-1.60	0.01-0.42	0.10-0.18	7.9-12.9	0.2-0.8	.32	.32			
8953:														
Wagstaff---------	0-7	1-10	50-75	20-32	1.30-1.40	4.23-14.11	0.18-0.20	2.9-5.9	2.0-4.0	.32	.32	2	6	48
	7-14	1-10	50-70	24-35	1.35-1.45	1.41-4.23	0.14-0.18	3.9-6.7	2.0-4.0	.32	.32			
	14-18	1-10	45-65	27-38	1.35-1.45	0.42-1.41	0.14-0.18	4.6-7.4	1.0-2.0	.32	.32			
	18-24	1-10	40-55	35-60	1.35-1.45	0.42-1.41	0.14-0.18	6.7-12.9	0.8-1.2	.32	.32			
	24-33	1-10	35-50	35-60	1.35-1.45	0.42-1.41	0.14-0.18	6.7-12.9	0.5-1.0	.32	.32			
	33-37	---	---	---	---	---	---	---	---	---	---			
8955:														
Wagstaff---------	0-7	1-10	50-75	20-32	1.30-1.40	4.23-14.11	0.18-0.20	2.9-5.9	2.0-4.0	.32	.32	2	6	48
	7-14	1-10	50-70	24-35	1.35-1.45	1.41-4.23	0.14-0.18	3.9-6.7	2.0-4.0	.32	.32			
	14-18	1-10	45-65	27-38	1.35-1.45	0.42-1.41	0.14-0.18	4.6-7.4	1.0-2.0	.32	.32			
	18-24	1-10	40-55	35-60	1.35-1.45	0.42-1.41	0.14-0.18	6.7-12.9	0.8-1.2	.32	.32			
	24-33	1-10	35-50	35-60	1.35-1.45	0.42-1.41	0.14-0.18	6.7-12.9	0.5-1.0	.32	.32			
	33-37	---	---	---	---	---	---	---	---	---	---			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
8957:														
Wagstaff---------	0-7	1-10	50-75	20-32	1.30-1.40	4.23-14.11	0.18-0.20	2.9-5.9	2.0-4.0	.32	.32	2	6	48
	7-14	1-10	50-70	24-35	1.35-1.45	1.41-4.23	0.14-0.18	3.9-6.7	2.0-4.0	.32	.32			
	14-18	1-10	45-65	27-38	1.35-1.45	0.42-1.41	0.14-0.18	4.6-7.4	1.0-2.0	.32	.32			
	18-24	1-10	40-55	35-60	1.35-1.45	0.42-1.41	0.14-0.18	6.7-12.9	0.8-1.2	.32	.32			
	24-33	1-10	35-50	35-60	1.35-1.45	0.42-1.41	0.14-0.18	6.7-12.9	0.5-1.0	.32	.32			
	33-37	---	---	---	---	---	---	---	---	---	---			
Summit-----------	0-11	1-15	50-65	32-45	1.25-1.50	1.41-4.23	0.16-0.20	5.9-9.2	2.0-4.0	.37	.37	5	4	86
	11-24	1-10	35-60	38-50	1.35-1.60	0.42-1.41	0.10-0.18	7.4-10.4	1.0-2.0	.32	.32			
	24-42	1-10	35-60	46-60	1.35-1.60	0.42-1.41	0.10-0.18	9.4-12.9	0.5-1.0	.32	.32			
	42-60	1-10	30-65	40-60	1.35-1.60	0.01-0.42	0.10-0.18	7.9-12.9	0.2-0.8	.32	.32			
8962:														
Woodson----------	0-7	1-10	50-75	18-27	1.25-1.45	1.41-4.23	0.22-0.24	2.4-4.6	2.0-4.0	.43	.43	3	6	48
	7-12	1-10	50-75	20-32	1.25-1.45	1.41-4.23	0.22-0.24	2.9-5.9	2.0-4.0	.43	.43			
	12-30	1-10	35-60	40-60	1.30-1.45	0.01-0.42	0.11-0.15	7.9-12.9	0.5-2.0	.32	.32			
	30-43	1-10	35-60	40-60	1.30-1.45	0.01-0.42	0.11-0.15	7.9-12.9	0.5-1.5	.32	.32			
	43-60	1-10	35-65	35-50	1.35-1.45	0.42-1.41	0.10-0.20	6.7-10.4	0.2-0.8	.32	.32			
9967.														
Arents, landfill														
9971.														
Arents, earthen dam														
9982.														
Fluvents														
9983.														
Pits, quarries														
9984.														
Made land														
9986.														
Miscellaneous water														
9991.														
Orthents														
9993.														
Pits														
9999.														
Water														

Table 20.--Chemical Properties of the Soil

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate
	Inches	meq/100 g	meq/100 g	pH	Pct
4015:					
Chase	0-10	16-33	---	5.6-7.3	0
	10-18	18-35	---	5.6-7.3	0
	18-42	23-42	---	5.6-7.3	0
	42-60	13-28	---	6.1-8.4	0
4752:					
Sogn	0-13	11-23	---	6.1-8.4	0-5
	13-17	---	---	---	---
Vinland	0-8	16-29	---	5.6-7.8	0
	8-12	15-28	---	5.6-7.8	0
	12-16	14-27	---	5.6-7.8	0
	16-20	---	---	---	---
7031:					
Eudora	0-7	4.8-16	---	6.1-7.3	0
	7-14	4.8-16	---	6.1-7.8	0
	14-40	4.5-15	---	6.6-8.4	0
	40-48	4.3-15	---	6.6-8.4	0-1
	48-80	4.3-14	---	6.6-8.4	0-5
7035:					
Eudora	0-7	4.8-15	---	6.1-7.3	0
	7-14	4.8-16	---	6.1-7.8	0
	14-40	4.5-15	---	6.6-8.4	0
	40-48	4.3-15	---	6.6-8.4	0-1
	48-80	4.3-14	---	6.6-8.4	0-5
Bismarckgrove	0-6	4.8-15	---	6.1-7.3	0
	6-14	15-28	---	6.6-7.8	0
	14-19	15-28	---	6.6-7.8	0-1
	19-29	15-28	---	6.6-8.4	0-1
	29-44	4.5-22	---	6.6-8.4	0-5
	44-80	4.3-15	---	6.6-8.4	0-5
7036:					
Eudora	0-7	4.8-16	---	6.1-7.3	0
	7-14	4.8-16	---	6.1-7.8	0
	14-40	4.5-15	---	6.6-8.4	0
	40-48	4.3-15	---	6.6-8.4	0-1
	48-80	4.3-14	---	6.6-8.4	0-5
Bismarckgrove	0-6	15-29	---	6.6-7.8	0
	6-14	15-28	---	6.6-7.8	0
	14-19	15-28	---	6.6-7.8	0-1
	19-29	15-28	---	6.6-8.4	0-1
	29-44	4.5-22	---	6.6-8.4	0-5
	44-80	4.3-15	---	6.6-8.4	0-5
7050:					
Kennebec	0-8	17-25	---	5.6-7.3	0
	8-18	17-25	---	6.1-7.3	0
	18-32	17-25	---	6.1-7.3	0
	32-41	17-25	---	6.1-7.3	0
	41-54	17-24	---	6.1-7.3	0-5
	54-80	16-24	---	6.1-7.3	0-5

Table 20.--Chemical Properties of the Soil--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
	Inches	meq/100 g	meq/100 g	pH	Pct
7051:					
Kennebec	0-8	17-25	---	5.6-7.3	0
	8-18	17-25	---	6.1-7.3	0
	18-32	17-25	---	6.1-7.3	0
	32-41	17-25	---	6.1-7.3	0
	41-54	17-24	---	6.1-7.3	0-5
	54-80	16-24	---	6.1-7.3	0-5
7055:					
Kimo	0-7	29-45	---	6.1-8.4	0
	7-15	26-45	---	6.6-8.4	0
	15-23	23-39	---	6.6-8.4	0
	23-27	18-36	---	6.6-8.4	0-5
	27-60	2.0-13	---	6.6-8.4	0-5
	60-80	2.0-10	---	6.6-8.4	0-5
7089:					
Stonehouse	0-9	4.8-15	---	6.1-7.3	0
	9-23	0.9-7.6	---	6.1-7.8	0
	23-31	0.9-7.4	---	6.1-7.8	0
	31-45	0.9-7.1	---	6.1-7.8	0
	45-71	0.9-7.6	---	6.1-8.4	0-5
	71-80	0.9-6.9	---	6.1-8.4	0-5
Eudora	0-7	4.8-15	---	6.1-7.3	0
	7-14	4.8-16	---	6.1-7.8	0
	14-40	4.5-15	---	6.6-8.4	0
	40-48	4.3-15	---	6.6-8.4	0-1
	48-80	4.3-14	---	6.6-8.4	0-5
7090:					
Wabash	0-5	25-36	---	5.6-7.3	0
	5-16	25-40	---	5.6-7.3	0
	16-52	20-46	---	5.6-7.8	0
	52-70	16-36	---	5.6-7.8	0
7105:					
Belvue	0-6	4.6-15	---	6.6-7.8	0
	6-11	4.5-15	---	7.8-8.4	0
	11-24	4.3-14	---	7.8-8.4	0-1
	24-39	4.3-14	---	7.8-8.4	0-5
	39-58	4.3-14	---	7.8-8.4	1-5
	58-80	4.2-14	---	7.8-8.4	1-5
7106:					
Eudora	0-7	4.8-16	---	6.1-7.3	0
	7-14	4.8-16	---	6.1-7.8	0
	14-40	4.5-15	---	6.6-8.4	0
	40-48	4.3-15	---	6.6-8.4	0-1
	48-80	4.3-14	---	6.6-8.4	0-5
Bismarckgrove	0-6	15-29	---	6.6-7.8	0
	6-14	15-28	---	6.6-7.8	0
	14-19	15-28	---	6.6-7.8	0-1
	19-29	15-28	---	6.6-8.4	0-1
	29-44	4.5-22	---	6.6-8.4	0-5
	44-80	4.3-15	---	6.6-8.4	0-5

Table 20.--Chemical Properties of the Soil--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
	Inches	meq/100 g	meq/100 g	pH	Pct
7123:					
Eudora	0-7	4.8-16	---	6.1-7.3	0
	7-14	4.8-16	---	6.1-7.8	0
	14-40	4.5-15	---	6.6-8.4	0
	40-48	4.3-15	---	6.6-8.4	0-1
	48-80	4.3-14	---	6.6-8.4	0-5
7155:					
Kimo	0-7	29-45	---	6.1-8.4	0
	7-15	26-45	---	6.6-8.4	0
	15-23	23-39	---	6.6-8.4	0
	23-27	18-35	---	6.6-8.4	0-5
	27-60	2.0-13	---	6.6-8.4	0-5
	60-80	2.0-10	---	6.6-8.4	0-5
7170:					
Reading	0-10	16-25	---	5.6-6.5	0
	10-15	17-25	---	5.6-6.5	0
	15-35	24-28	---	5.6-6.5	0
	35-41	23-28	---	5.6-6.5	0
	41-60	23-34	---	6.1-8.4	0
7251:					
Grundy	0-9	14-32	---	5.6-7.3	0
	9-15	18-33	---	5.6-7.3	0
	15-29	19-39	---	5.1-7.3	0
	29-44	13-25	---	5.6-7.3	0
	44-60	8.5-18	---	5.6-7.3	0
7261:					
Gymer	0-6	18-29	---	5.1-6.5	0
	6-15	16-30	---	5.1-6.5	0
	15-30	21-34	---	5.6-6.5	0
	30-80	12-24	---	5.6-6.5	0
7285:					
Ladoga	0-8	16-29	---	6.1-6.5	0
	8-13	16-30	---	6.1-6.5	0
	13-31	18-31	---	5.1-6.0	0
	31-60	10-21	---	5.1-6.5	0
7286:					
Ladoga	0-8	16-29	---	6.1-6.5	0
	8-13	16-30	---	6.1-6.5	0
	13-31	18-30	---	5.1-6.0	0
	31-60	10-21	---	5.1-6.5	0
7302:					
Martin	0-9	17-35	---	5.6-6.5	0
	9-15	20-38	---	5.6-6.5	0
	15-34	20-39	---	5.6-7.8	0
	34-60	20-34	---	5.6-7.8	0
7330:					
Martin	0-9	17-35	---	5.6-6.5	0
	9-15	20-38	---	5.6-6.5	0
	15-34	20-38	---	5.6-7.8	0
	34-60	20-34	---	5.6-7.8	0

Table 20.--Chemical Properties of the Soil--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
	Inches	meq/100 g	meq/100 g	pH	Pct
7330:					
Vinland	0-4	22-29	---	5.6-7.8	0
	4-11	15-28	---	5.6-7.8	0
	11-18	14-27	---	5.6-7.8	0
	18-20	---	---	---	---
7433:					
Morrill	0-9	13-25	---	5.1-7.3	0
	9-13	15-25	---	5.1-7.3	0
	13-22	20-28	---	5.1-7.3	0
	22-39	19-27	---	5.1-7.3	0
	39-60	15-27	---	5.1-7.3	0
7460:					
Oska	0-9	23-37	---	5.6-6.5	0
	9-31	20-46	---	5.6-7.8	0
	31-38	14-26	---	5.6-7.8	0
	38-42	---	---	---	---
7462:					
Oska	0-8	23-33	---	5.6-6.5	0
	8-16	18-35	---	5.6-6.5	0
	16-32	14-28	---	5.6-7.3	0
	32-36	---	---	---	---
Martin	0-9	23-40	---	5.6-6.5	0
	9-15	23-40	---	5.6-6.5	0
	15-34	20-39	---	5.6-7.8	0
	34-60	16-39	---	6.1-7.8	0
7502:					
Pawnee	0-8	23-36	---	5.6-7.3	0
	8-12	20-35	---	5.6-7.3	0
	12-40	19-35	---	6.1-8.4	0
	40-49	16-26	---	7.4-8.4	0-5
	49-60	8.0-19	---	7.4-8.4	0-5
7525:					
Chillicothe	0-5	16-19	---	5.6-6.5	0
	5-13	16-19	---	5.6-6.5	0
	13-19	16-19	---	5.6-6.5	0
	19-31	19-24	---	5.1-6.5	0
	31-43	19-24	---	5.1-6.5	0
	43-48	19-24	---	5.1-6.5	0
	48-60	23-28	---	5.1-6.5	0
	60-81	23-28	---	5.1-6.5	0
	81-85	---	---	---	---
7535:					
Sharpsburg	0-9	20-30	---	5.1-7.3	0
	9-13	20-33	---	5.1-6.0	0
	13-35	24-30	---	5.1-6.0	0
	35-60	20-26	---	6.1-6.5	0
7545:					
Sharpsburg	0-9	20-30	---	5.1-7.3	0
	9-13	20-33	---	5.1-6.0	0
	13-35	24-30	---	5.1-6.0	0
	35-60	20-26	---	6.1-6.5	0
Urban land.					

Table 20.--Chemical Properties of the Soil--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate
	Inches	meq/100 g	meq/100 g	pH	Pct
7603:					
Sibleyville----------	0-7	12-24	---	5.6-7.3	0
	7-15	16-27	---	5.1-7.3	0
	15-27	11-22	---	5.1-7.3	0
	27-31	---	---	---	---
7607:					
Sibleyville----------	0-8	13-23	---	5.6-7.3	0
	8-22	17-28	---	5.1-7.3	0
	22-29	12-25	---	5.1-7.3	0
	29-33	---	---	---	---
Vinland--------------	0-4	22-29	---	5.6-7.8	0
	4-11	22-28	---	5.6-7.8	0
	11-18	16-27	---	5.6-7.8	0
	18-22	---	---	---	---
7658:					
Vinland--------------	0-4	22-29	---	5.6-7.8	0
	4-11	22-28	---	5.6-7.8	0
	11-17	16-27	---	5.6-7.8	0
	17-21	---	---	---	---
Rock outcrop.					
7805:					
Arisburg-------------	0-9	16-36	---	5.6-7.3	0
	9-15	18-33	---	5.6-6.5	0
	15-22	21-32	---	5.6-6.5	0
	22-29	18-31	---	5.6-6.5	0
	29-44	14-28	---	5.6-6.5	0
	44-60	11-20	---	5.6-7.3	0
8101:					
Hepler---------------	0-9	10-16	---	5.1-6.5	0
	9-25	9.0-15	---	4.5-6.0	0
	25-40	---	11-17	4.5-6.5	0
	40-60	15-22	---	4.5-6.5	0
8301:					
Verdigris------------	0-9	13-25	---	5.6-7.3	0
	9-27	13-25	---	5.6-7.3	0
	27-32	13-25	---	5.6-7.3	0
	32-52	13-25	---	5.6-7.3	0
	52-60	12-24	---	5.6-7.3	0
8302:					
Verdigris------------	0-9	13-25	---	5.6-7.3	0
	9-27	13-25	---	5.6-7.3	0
	27-32	13-25	---	5.6-7.3	0
	32-52	13-25	---	5.6-7.3	0
	52-60	12-24	---	5.6-7.3	0
8390:					
Wynona---------------	0-10	13-19	---	5.6-6.5	0
	10-14	13-19	---	5.1-6.5	0
	14-38	14-19	---	5.1-6.5	0
	38-53	16-24	---	5.1-6.5	0
	53-60	14-24	---	5.1-6.5	0

Table 20.--Chemical Properties of the Soil--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
	Inches	meq/100 g	meq/100 g	pH	Pct
8501:					
Mason----------------	0-8	17-23	---	5.6-7.3	0
	8-18	19-25	---	5.6-7.3	0
	18-41	19-28	---	5.1-7.3	0
	41-60	17-27	---	5.1-7.8	0
8640:					
Bucyrus--------------	0-8	18-33	---	5.6-6.5	0
	8-16	19-33	---	5.6-6.5	0
	16-22	18-29	---	5.1-6.5	0
	22-32	21-41	---	5.1-6.0	0
	32-52	18-39	---	5.1-7.3	0
	52-71	15-33	---	5.1-7.3	0
	71-75	---	---	---	---
8641:					
Bucyrus--------------	0-6	20-35	---	5.6-6.5	0
	6-17	18-29	---	5.1-6.5	0
	17-32	20-41	---	5.1-6.0	0
	32-52	18-39	---	5.1-7.3	0
	52-71	15-32	---	5.1-7.3	0
	71-75	---	---	---	---
8663:					
Clareson-------------	0-7	22-32	---	5.6-7.3	0
	7-15	22-30	---	5.6-7.3	0
	15-26	23-34	---	5.6-7.3	0
	26-30	---	---	---	---
Rock outcrop.					
8789:					
Lebo-----------------	0-11	19-28	---	5.6-7.8	0
	11-18	17-27	---	5.6-7.8	0
	18-28	16-26	---	5.6-7.8	0
	28-38	15-26	---	5.6-7.8	0
	38-42	---	---	---	---
8911:					
Summit---------------	0-11	27-45	---	5.6-7.3	0
	11-24	24-39	---	5.6-7.3	0
	24-42	23-36	---	5.6-7.3	0
	42-60	16-33	---	6.1-8.4	0
8912:					
Summit---------------	0-11	27-45	---	5.6-7.3	0
	11-24	24-39	---	5.6-7.3	0
	24-42	23-36	---	5.6-7.3	0
	42-60	16-33	---	6.1-8.4	0
8953:					
Wagstaff-------------	0-7	18-33	---	5.6-7.3	0
	7-14	21-36	---	5.6-7.3	0
	14-18	18-31	---	5.6-7.3	0
	18-24	21-39	---	5.6-7.3	0
	24-33	18-36	---	5.6-7.3	0
	33-37	---	---	---	---

Table 20.--Chemical Properties of the Soil--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
	Inches	meq/100 g	meq/100 g	pH	Pct
8955:					
Wagstaff	0-7	18-33	---	5.6-7.3	0
	7-14	21-36	---	5.6-7.3	0
	14-18	18-31	---	5.6-7.3	0
	18-24	21-39	---	5.6-7.3	0
	24-33	18-36	---	5.6-7.3	0
	33-37	---	---	---	---
8957:					
Wagstaff	0-7	18-33	---	5.6-7.3	0
	7-14	21-36	---	5.6-7.3	0
	14-18	18-31	---	5.6-7.3	0
	18-24	21-39	---	5.6-7.3	0
	24-33	18-36	---	5.6-7.3	0
	33-37	---	---	---	---
Summit	0-11	27-45	---	5.6-7.3	0
	11-24	24-39	---	5.6-7.3	0
	24-42	23-36	---	5.6-7.3	0
	42-60	16-33	---	6.1-8.4	0
8962:					
Woodson	0-7	16-29	---	5.6-6.5	0
	7-12	18-33	---	5.6-6.5	0
	12-30	20-46	---	5.6-7.3	0
	30-43	20-42	---	5.6-7.3	0
	43-60	13-29	---	5.6-7.8	0
9967. Arents, landfill					
9971. Arents, earthen dam					
9982. Fluvents					
9983. Pits, quarries					
9984. Made land					
9986. Miscellaneous water					
9991. Orthents					
9993. Pits					
9999. Water					

Table 21.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
4015:						
Chase	---	---	---	High	High	Low
4752:						
Sogn	Bedrock (lithic)	4-20	Indurated	Moderate	Low	Low
Vinland	Bedrock (paralithic)	10-20	Weakly cemented	Moderate	Low	Moderate
7031:						
Eudora	---	---	---	High	Low	Low
7035:						
Eudora	---	---	---	High	Low	Low
Bismarckgrove	---	---	---	High	Low	Low
7036:						
Eudora	---	---	---	High	Low	Low
Bismarckgrove	---	---	---	High	Low	Low
7050:						
Kennebec	---	---	---	High	Moderate	Low
7051:						
Kennebec	---	---	---	High	Moderate	Low
7055:						
Kimo	---	---	---	High	High	Low
7089:						
Stonehouse	---	---	---	Low	Low	Low
Eudora	---	---	---	High	Low	Low
7090:						
Wabash	---	---	---	Moderate	High	Moderate
7105:						
Belvue	---	---	---	High	Low	Low
7106:						
Eudora	---	---	---	High	Low	Low
Bismarckgrove	---	---	---	High	Low	Low
7123:						
Eudora	---	---	---	High	Low	Low
7155:						
Kimo	---	---	---	High	High	Low
7170:						
Reading	---	---	---	High	Moderate	Low
7251:						
Grundy	---	---	---	High	High	Moderate

Table 21.--Soil Features--Continued

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
7261:						
Gymer	---	---	---	Moderate	Moderate	Moderate
7285:						
Ladoga	---	---	---	Moderate	Moderate	Moderate
7286:						
Ladoga	---	---	---	Moderate	Moderate	Moderate
7302:						
Martin	---	---	---	High	High	Low
7330:						
Martin	---	---	---	High	High	Low
Vinland	Bedrock (paralithic)	10-20	Weakly cemented	Moderate	Low	Moderate
7433:						
Morrill	---	---	---	Moderate	Moderate	Moderate
7460:						
Oska	Bedrock (lithic)	20-40	Indurated	Moderate	Moderate	Moderate
7462:						
Oska	Bedrock (lithic)	20-40	Indurated	Moderate	Moderate	Moderate
Martin	---	---	---	High	High	Low
7502:						
Pawnee	---	---	---	High	High	Low
7525:						
Chillicothe	---	---	---	Moderate	Moderate	Moderate
7535:						
Sharpsburg	---	---	---	High	Moderate	Moderate
7545:						
Sharpsburg	---	---	---	High	Moderate	Moderate
Urban land.						
7603:						
Sibleyville	Bedrock (paralithic)	20-40	Weakly cemented	Moderate	Low	Moderate
7607:						
Sibleyville	Bedrock (paralithic)	20-40	Weakly cemented	Moderate	Low	Moderate
Vinland	Bedrock (paralithic)	10-20	Weakly cemented	Moderate	Low	Moderate
7658:						
Vinland	Bedrock (paralithic)	10-20	Weakly cemented	Moderate	Low	Moderate
Rock outcrop.						
7805:						
Arisburg	---	---	---	High	High	Moderate

Table 21.--Soil Features--Continued

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
8101:						
Hepler	---	---	---	Low	High	Moderate
8301:						
Verdigris	---	---	---	---	Low	Low
8302:						
Verdigris	---	---	---	---	Low	Low
8390:						
Wynona	---	---	---	---	High	Moderate
8501:						
Mason	---	---	---	None	Moderate	Moderate
8640:						
Bucyrus	Bedrock (lithic)	60-80	Indurated	---	Moderate	Moderate
8641:						
Bucyrus	Bedrock (lithic)	60-80	Indurated	---	Moderate	Moderate
8663:						
Clareson	Bedrock (lithic)	20-40	Indurated	---	High	Moderate
Rock outcrop	Bedrock (lithic)	0-0	---	None	---	---
8789:						
Lebo	Bedrock (paralithic)	20-40	Noncemented	None	Moderate	Low
8911:						
Summit	---	---	---	None	High	Low
8912:						
Summit	---	---	---	None	High	Low
8953:						
Wagstaff	Bedrock (lithic)	20-40	Indurated	---	High	Low
8955:						
Wagstaff	Bedrock (lithic)	20-40	Indurated	---	High	Low
8957:						
Wagstaff	Bedrock (lithic)	20-40	Indurated	---	High	Low
Summit	---	---	---	None	High	Low
8962:						
Woodson	---	---	---	Low	High	Moderate
9967. Arents, landfill						
9971. Arents, earthen dam						
9982. Fluvents						
9983. Pits, quarries						

Table 21.--Soil Features--Continued

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
9984. Made land						
9986. Miscellaneous water						
9991:						
Orthents	---	---	---	Low	High	Moderate
9993. Pits						
9999. Water						

Table 22.--Water Features

(Depths of layers are in feet. See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
				Ft	Ft		
4015:							
Chase	C	High					
			January	1.8-2.2	3.8-4.2	Brief	Occasional
			February	1.8-2.2	3.8-4.2	Brief	Occasional
			March	1.8-2.2	3.8-4.2	Brief	Occasional
			April	1.8-2.2	3.8-4.2	Brief	Occasional
			May	---	---	Brief	Occasional
			June	---	---	Brief	Occasional
			July	---	---	Brief	Occasional
			August	---	---	Brief	Occasional
			September	---	---	Brief	Occasional
			October	---	---	Brief	Occasional
			November	---	---	Brief	Occasional
			December	---	---	Brief	Occasional
4752:							
Sogn	D	Medium					
			Jan-Dec	---	---	---	None
Vinland	D	Medium					
			Jan-Dec	---	---	---	None
7031:							
Eudora	B	Low					
			January	---	---	Brief	Occasional
			February	---	---	Brief	Occasional
			March	---	---	Brief	Occasional
			April	---	---	Brief	Occasional
			May	---	---	Brief	Occasional
			June	---	---	Brief	Occasional
			July	---	---	Brief	Occasional
			August	---	---	Brief	Occasional
			September	---	---	Brief	Occasional
			October	---	---	Brief	Occasional
			November	---	---	Brief	Occasional
			December	---	---	Brief	Occasional
7035:							
Eudora	B	Low					
			January	---	---	Brief	Occasional
			February	---	---	Brief	Occasional
			March	---	---	Brief	Occasional
			April	---	---	Brief	Occasional
			May	---	---	Brief	Occasional
			June	---	---	Brief	Occasional
			July	---	---	Brief	Occasional
			August	---	---	Brief	Occasional
			September	---	---	Brief	Occasional
			October	---	---	Brief	Occasional
			November	---	---	Brief	Occasional
			December	---	---	Brief	Occasional

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
				Ft	Ft		
7035:							
Bismarckgrove	B	Low					
			January	---	---	Brief	Occasional
			February	---	---	Brief	Occasional
			March	---	---	Brief	Occasional
			April	---	---	Brief	Occasional
			May	---	---	Brief	Occasional
			June	---	---	Brief	Occasional
			July	---	---	Brief	Occasional
			August	---	---	Brief	Occasional
			September	---	---	Brief	Occasional
			October	---	---	Brief	Occasional
			November	---	---	Brief	Occasional
			December	---	---	Brief	Occasional
7036:							
Eudora	B	Low					
			January	---	---	Brief	Occasional
			February	---	---	Brief	Occasional
			March	---	---	Brief	Occasional
			April	---	---	Brief	Occasional
			May	---	---	Brief	Occasional
			June	---	---	Brief	Occasional
			July	---	---	Brief	Occasional
			August	---	---	Brief	Occasional
			September	---	---	Brief	Occasional
			October	---	---	Brief	Occasional
			November	---	---	Brief	Occasional
			December	---	---	Brief	Occasional
Bismarckgrove	B	Low					
			January	---	---	Brief	Occasional
			February	---	---	Brief	Occasional
			March	---	---	Brief	Occasional
			April	---	---	Brief	Occasional
			May	---	---	Brief	Occasional
			June	---	---	Brief	Occasional
			July	---	---	Brief	Occasional
			August	---	---	Brief	Occasional
			September	---	---	Brief	Occasional
			October	---	---	Brief	Occasional
			November	---	---	Brief	Occasional
			December	---	---	Brief	Occasional
7050:							
Kennebec	B	Low					
			January	---	---	Brief	Occasional
			February	3.3-3.7	>6.0	Brief	Occasional
			March	3.3-3.7	>6.0	Brief	Occasional
			April	3.3-3.7	>6.0	Brief	Occasional
			May	---	---	Brief	Occasional
			June	---	---	Brief	Occasional
			July	---	---	Brief	Occasional
			August	---	---	Brief	Occasional
			September	---	---	Brief	Occasional
			October	---	---	Brief	Occasional
			November	---	---	Brief	Occasional
			December	---	---	Brief	Occasional

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
				Ft	Ft		
7051:							
Kennebec	B	Low					
			January	---	---	Brief	Frequent
			February	3.3-3.7	>6.0	Brief	Frequent
			March	3.3-3.7	>6.0	Brief	Frequent
			April	3.3-3.7	>6.0	Brief	Frequent
			May	---	---	Brief	Frequent
			June	---	---	Brief	Frequent
			July	---	---	Brief	Frequent
			August	---	---	Brief	Frequent
			September	---	---	Brief	Frequent
			October	---	---	Brief	Frequent
			November	---	---	Brief	Frequent
			December	---	---	Brief	Frequent
7055:							
Kimo	C	Low					
			January	1.8-2.2	>6.0	Brief	Occasional
			February	1.8-2.2	>6.0	Brief	Occasional
			March	1.8-2.2	>6.0	Brief	Occasional
			April	1.8-2.2	>6.0	Brief	Occasional
			May	1.8-2.2	>6.0	Brief	Occasional
			June	---	---	Brief	Occasional
			July	---	---	Brief	Occasional
			August	---	---	Brief	Occasional
			September	---	---	Brief	Occasional
			October	---	---	Brief	Occasional
			November	---	---	Brief	Occasional
			December	---	---	Brief	Occasional
7089:							
Stonehouse	A	Negligible					
			January	---	---	Brief	Occasional
			February	---	---	Brief	Occasional
			March	---	---	Brief	Occasional
			April	---	---	Brief	Occasional
			May	---	---	Brief	Occasional
			June	---	---	Brief	Occasional
			July	---	---	Brief	Occasional
			August	---	---	Brief	Occasional
			September	---	---	Brief	Occasional
			October	---	---	Brief	Occasional
			November	---	---	Brief	Occasional
			December	---	---	Brief	Occasional
Eudora	B	Low					
			January	---	---	Brief	Occasional
			February	---	---	Brief	Occasional
			March	---	---	Brief	Occasional
			April	---	---	Brief	Occasional
			May	---	---	Brief	Occasional
			June	---	---	Brief	Occasional
			July	---	---	Brief	Occasional
			August	---	---	Brief	Occasional
			September	---	---	Brief	Occasional
			October	---	---	Brief	Occasional
			November	---	---	Brief	Occasional
			December	---	---	Brief	Occasional

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table Upper limit	Water table Lower limit	Flooding Duration	Flooding Frequency
				Ft	Ft		
7090:							
Wabash----------------	D	Very high					
			January	0.2-0.8	>6.0	Very brief	Occasional
			February	0.2-0.8	>6.0	Very brief	Occasional
			March	0.2-0.8	>6.0	Very brief	Occasional
			April	0.2-0.8	>6.0	Very brief	Occasional
			May	0.2-0.8	>6.0	Very brief	Occasional
			June	0.8-1.2	>6.0	Very brief	Occasional
			July	---	---	Very brief	Occasional
			August	---	---	Very brief	Occasional
			September	---	---	Very brief	Occasional
			October	---	---	Very brief	Occasional
			November	0.8-1.2	>6.0	Very brief	Occasional
			December	0.8-1.2	>6.0	Very brief	Occasional
7105:							
Belvue----------------	B	Low					
			January	---	---	Brief	Occasional
			February	---	---	Brief	Occasional
			March	---	---	Brief	Occasional
			April	---	---	Brief	Occasional
			May	---	---	Brief	Occasional
			June	---	---	Brief	Occasional
			July	---	---	Brief	Occasional
			August	---	---	Brief	Occasional
			September	---	---	Brief	Occasional
			October	---	---	Brief	Occasional
			November	---	---	Brief	Occasional
			December	---	---	Brief	Occasional
7106:							
Eudora----------------	B	Low					
			January	---	---	---	Rare
			February	---	---	---	Rare
			March	---	---	---	Rare
			April	---	---	---	Rare
			May	---	---	---	Rare
			June	---	---	---	Rare
			July	---	---	---	Rare
			August	---	---	---	Rare
			September	---	---	---	Rare
			October	---	---	---	Rare
			November	---	---	---	Rare
			December	---	---	---	Rare
Bismarckgrove---------	B	Low					
			January	---	---	---	Rare
			February	---	---	---	Rare
			March	---	---	---	Rare
			April	---	---	---	Rare
			May	---	---	---	Rare
			June	---	---	---	Rare
			July	---	---	---	Rare
			August	---	---	---	Rare
			September	---	---	---	Rare
			October	---	---	---	Rare
			November	---	---	---	Rare
			December	---	---	---	Rare

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
				Ft	Ft		
7123:							
Eudora----------------	B	Low					
			January	---	---	---	Rare
			February	---	---	---	Rare
			March	---	---	---	Rare
			April	---	---	---	Rare
			May	---	---	---	Rare
			June	---	---	---	Rare
			July	---	---	---	Rare
			August	---	---	---	Rare
			September	---	---	---	Rare
			October	---	---	---	Rare
			November	---	---	---	Rare
			December	---	---	---	Rare
7155:							
Kimo------------------	C	Low					
			January	1.8-2.2	>6.0	---	Rare
			February	1.8-2.2	>6.0	---	Rare
			March	1.8-2.2	>6.0	---	Rare
			April	1.8-2.2	>6.0	---	Rare
			May	1.8-2.2	>6.0	---	Rare
			June	---	---	---	Rare
			July	---	---	---	Rare
			August	---	---	---	Rare
			September	---	---	---	Rare
			October	---	---	---	Rare
			November	---	---	---	Rare
			December	---	---	---	Rare
7170:							
Reading---------------	B	Low					
			January	---	---	---	Rare
			February	---	---	---	Rare
			March	---	---	---	Rare
			April	---	---	---	Rare
			May	---	---	---	Rare
			June	---	---	---	Rare
			July	---	---	---	Rare
			August	---	---	---	Rare
			September	---	---	---	Rare
			October	---	---	---	Rare
			November	---	---	---	Rare
			December	---	---	---	Rare
7251:							
Grundy----------------	C	High					
			January	1.0-1.4	2.3-2.7	---	None
			February	1.0-1.4	2.3-2.7	---	None
			March	1.0-1.4	2.3-2.7	---	None
			April	1.0-1.4	2.3-2.7	---	None
7261:							
Gymer-----------------	C	High					
			Jan-Dec	---	---	---	None
7285:							
Ladoga----------------	B	Medium					
			February	3.8-4.2	4.8-5.2	---	None
			March	3.8-4.2	4.8-5.2	---	None
			April	3.8-4.2	4.8-5.2	---	None

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
				Ft	Ft		
7286:							
Ladoga	B	High					
			February	3.8-4.2	4.8-5.2	---	None
			March	3.8-4.2	4.8-5.2	---	None
			April	3.8-4.2	4.8-5.2	---	None
7302:							
Martin	C	Medium					
			February	1.8-2.2	2.8-3.2	---	None
			March	1.8-2.2	2.8-3.2	---	None
			April	1.8-2.2	2.8-3.2	---	None
7330:							
Martin	C	Very high					
			February	1.8-2.2	2.8-3.2	---	None
			March	1.8-2.2	2.8-3.2	---	None
			April	1.8-2.2	2.8-3.2	---	None
Vinland	D	High					
			Jan-Dec	---	---	---	None
7433:							
Morrill	B	Medium					
			Jan-Dec	---	---	---	None
7460:							
Oska	C	High					
			Jan-Dec	---	---	---	None
7462:							
Oska	C	High					
			Jan-Dec	---	---	---	None
Martin	C	Very high					
			February	1.8-2.2	2.8-3.2	---	None
			March	1.8-2.2	2.8-3.2	---	None
			April	1.8-2.2	2.8-3.2	---	None
7502:							
Pawnee	D	High					
			February	1.0-1.4	2.8-3.2	---	None
			March	1.0-1.4	2.8-3.2	---	None
			April	1.0-1.4	2.8-3.2	---	None
7525:							
Chillicothe	B	Medium					
			February	2.3-2.7	3.3-3.7	---	None
			March	2.3-2.7	3.3-3.7	---	None
			April	2.3-2.7	3.3-3.7	---	None
7535:							
Sharpsburg	B	Medium					
			February	3.0-3.3	4.0-4.3	---	None
			March	3.0-3.3	4.0-4.3	---	None
			April	3.0-3.3	4.0-4.3	---	None

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
				Ft	Ft		
7545:							
Sharpsburg	B	Medium					
			February	3.0-3.3	4.0-4.3	---	None
			March	3.0-3.3	4.0-4.3	---	None
			April	3.0-3.3	4.0-4.3	---	None
Urban land	---	Very high					
			Jan-Dec	---	---	---	None
7603:							
Sibleyville	B	Medium					
			Jan-Dec	---	---	---	None
7607:							
Sibleyville	B	Medium					
			Jan-Dec	---	---	---	None
Vinland	D	Medium					
			Jan-Dec	---	---	---	None
7658:							
Vinland	D	High					
			Jan-Dec	---	---	---	None
Rock outcrop	---	Very high					
			Jan-Dec	---	---	---	None
7805:							
Arisburg	C	Medium					
			January	1.3-1.7	2.3-2.7	---	None
			February	1.3-1.7	2.3-2.7	---	None
			March	1.3-1.7	2.3-2.7	---	None
			April	1.3-1.7	2.3-2.7	---	None
8101:							
Hepler	C	Low					
			January	1.0-1.4	3.0-3.4	Very brief	Occasional
			February	1.0-1.4	3.0-3.4	Very brief	Occasional
			March	1.0-1.4	3.0-3.4	Very brief	Occasional
			April	1.0-1.4	3.0-3.4	Very brief	Occasional
			May	1.0-1.4	3.0-3.4	Very brief	Occasional
			June	---	---	Very brief	Occasional
			July	---	---	Very brief	Occasional
			August	---	---	Very brief	Occasional
			September	---	---	Very brief	Occasional
			October	---	---	Very brief	Occasional
			November	---	---	Very brief	Occasional
			December	1.0-1.4	3.0-3.4	Very brief	Occasional

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
				Ft	Ft		
8301:							
Verdigris	B	Low					
			January	---	---	Very brief	Frequent
			February	---	---	Very brief	Frequent
			March	---	---	Very brief	Frequent
			April	---	---	Very brief	Frequent
			May	---	---	Very brief	Frequent
			June	---	---	Very brief	Frequent
			July	---	---	Very brief	Frequent
			August	---	---	Very brief	Frequent
			September	---	---	Very brief	Frequent
			October	---	---	Very brief	Frequent
			November	---	---	Very brief	Frequent
			December	---	---	Very brief	Frequent
8302:							
Verdigris	B	Low					
			January	---	---	Very brief	Occasional
			February	---	---	Very brief	Occasional
			March	---	---	Very brief	Occasional
			April	---	---	Very brief	Occasional
			May	---	---	Very brief	Occasional
			June	---	---	Very brief	Occasional
			July	---	---	Very brief	Occasional
			August	---	---	Very brief	Occasional
			September	---	---	Very brief	Occasional
			October	---	---	Very brief	Occasional
			November	---	---	Very brief	Occasional
			December	---	---	Very brief	Occasional
8390:							
Wynona	C	Low					
			January	1.0-1.4	3.0-3.4	Very brief	Occasional
			February	1.0-1.4	3.0-3.4	Very brief	Occasional
			March	1.0-1.4	3.0-3.4	Very brief	Occasional
			April	1.0-1.4	3.0-3.4	Very brief	Occasional
			May	1.0-1.4	3.0-3.4	Very brief	Occasional
			June	---	---	Very brief	Occasional
			July	---	---	Very brief	Occasional
			August	---	---	Very brief	Occasional
			September	---	---	Very brief	Occasional
			October	---	---	Very brief	Occasional
			November	---	---	Very brief	Occasional
			December	1.0-1.4	3.0-3.4	Very brief	Occasional
8501:							
Mason	B	Medium					
			January	---	---	---	Rare
			February	---	---	---	Rare
			March	---	---	---	Rare
			April	---	---	---	Rare
			May	---	---	---	Rare
			June	---	---	---	Rare
			July	---	---	---	Rare
			August	---	---	---	Rare
			September	---	---	---	Rare
			October	---	---	---	Rare
			November	---	---	---	Rare
			December	---	---	---	Rare

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table Upper limit	Water table Lower limit	Flooding Duration	Flooding Frequency
				Ft	Ft		
8640:							
Bucyrus	C	Medium					
			Jan-Dec	---	---	---	None
8641:							
Bucyrus	C	High					
			Jan-Dec	---	---	---	None
8663:							
Clareson	C	Very high					
			Jan-Dec	---	---	---	None
Rock outcrop	D	High					
			Jan-Dec	---	---	---	None
8789:							
Lebo	B	High					
			Jan-Dec	---	---	---	None
8911:							
Summit	C	High					
			February	1.8-2.2	2.8-3.2	---	None
			March	1.8-2.2	2.8-3.2	---	None
			April	1.8-2.2	2.8-3.2	---	None
8912:							
Summit	C	Very high					
			February	1.8-2.2	2.8-3.2	---	None
			March	1.8-2.2	2.8-3.2	---	None
			April	1.8-2.2	2.8-3.2	---	None
8953:							
Wagstaff	C	High					
			Jan-Dec	---	---	---	None
8955:							
Wagstaff	C	High					
			Jan-Dec	---	---	---	None
8957:							
Wagstaff	C	Very high					
			Jan-Dec	---	---	---	None
Summit	C	Very high					
			February	1.8-2.2	2.8-3.2	---	None
			March	1.8-2.2	2.8-3.2	---	None
			April	1.8-2.2	2.8-3.2	---	None
8962:							
Woodson	D	Medium					
			January	1.0-1.4	1.8-2.2	---	None
			February	1.0-1.4	1.8-2.2	---	None
			March	1.0-1.4	1.8-2.2	---	None
			April	1.0-1.4	1.8-2.2	---	None
			May	1.0-1.4	1.8-2.2	---	None
9967.							
Arents, landfill							
9971.							
Arents, earthen dam							

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
				Ft	Ft		
9982:							
Fluvents	---	---					
			January	2.8-3.2	>6.0	Brief	Frequent
			February	2.8-3.2	>6.0	Brief	Frequent
			March	2.8-3.2	>6.0	Brief	Frequent
			April	2.8-3.2	>6.0	Brief	Frequent
			May	---	---	Brief	Frequent
			June	---	---	Brief	Frequent
			July	---	---	Brief	Frequent
			August	---	---	Brief	Frequent
			September	---	---	Brief	Frequent
			October	---	---	Brief	Frequent
			November	---	---	Brief	Frequent
			December	---	---	Brief	Frequent
9983. Pits, quarries							
9984. Made land							
9986. Miscellaneous water							
9991. Orthents							
9993. Pits							
9999. Water							

Table 23.--Classification of the Soils

Soil name	Family or higher taxonomic class
Arisburg	Fine, smectitic, mesic Aquertic Argiudolls
Belvue	Coarse-silty, mixed, superactive, nonacid, mesic Typic Udifluvents
Bendena	Loamy, mixed, superactive, mesic Lithic Hapludolls
Bismarckgrove	Fine-silty, mixed, superactive, mesic Fluventic Hapludolls
Bourbonais	Coarse-silty over sandy or sandy-skeletal, mixed, superactive, mesic Fluventic Hapludolls
Bucyrus	Fine, smectitic, thermic Vertic Paleudolls
Chase	Fine, smectitic, mesic Aquertic Argiudolls
Chillicothe	Fine, smectitic, mesic Oxyaquic Argiudolls
Clareson	Clayey-skeletal, mixed, superactive, thermic Typic Argiudolls
Dennis	Fine, mixed, active, thermic Aquic Argiudolls
Eram	Fine, mixed, active, thermic Aquic Argiudolls
Eudora	Coarse-silty, mixed, superactive, mesic Fluventic Hapludolls
Grundy	Fine, smectitic, mesic Aquertic Argiudolls
Gymer	Fine, smectitic, mesic Typic Argiudolls
Hepler	Fine-silty, mixed, active, thermic Mollic Endoaqualfs
Kennebec	Fine-silty, mixed, superactive, mesic Cumulic Hapludolls
Kenoma	Fine, smectitic, thermic Vertic Argiudolls
Kimo	Clayey over loamy, smectitic, mesic Fluvaquentic Hapludolls
Kiro	Fine, smectitic, mesic Fluvaquentic Endoaquolls
Ladoga	Fine, smectitic, mesic Vertic Hapludalfs
Lebo	Loamy-skeletal, mixed, active, thermic Typic Hapludolls
Martin	Fine, smectitic, mesic Aquertic Argiudolls
Mason	Fine-silty, mixed, active, thermic Pachic Argiudolls
Morrill	Fine-loamy, mixed, superactive, mesic Typic Argiudolls
Muscotah	Fine, smectitic, mesic Cumulic Hapludolls
Osage	Fine, smectitic, thermic Typic Epiaquerts
Oska	Fine, smectitic, mesic Vertic Argiudolls
Pawnee	Fine, smectitic, mesic Oxyaquic Vertic Argiudolls
Reading	Fine-silty, mixed, superactive, mesic Pachic Argiudolls
Sharpsburg	Fine, smectitic, mesic Typic Argiudolls
Shidler	Loamy, mixed, active, thermic Lithic Haplustolls
Sibleyville	Fine-loamy, mixed, superactive, mesic Typic Argiudolls
Sogn	Loamy, mixed, superactive, mesic Lithic Haplustolls
Stonehouse	Sandy, mixed, mesic Typic Udifluvents
Summit	Fine, smectitic, thermic Oxyaquic Vertic Argiudolls
Thurman	Sandy, mixed, mesic Udorthentic Haplustolls
Verdigris	Fine-silty, mixed, superactive, thermic Cumulic Hapludolls
Vinland	Loamy, mixed, superactive, mesic, shallow Typic Hapludolls
Wabash	Fine, smectitic, mesic Cumulic Vertic Endoaquolls
Wagstaff	Fine, smectitic, thermic Vertic Argiudolls
Woodson	Fine, smectitic, thermic Abruptic Argiaquolls
Wynona	Fine-silty, mixed, active, thermic Cumulic Epiaquolls

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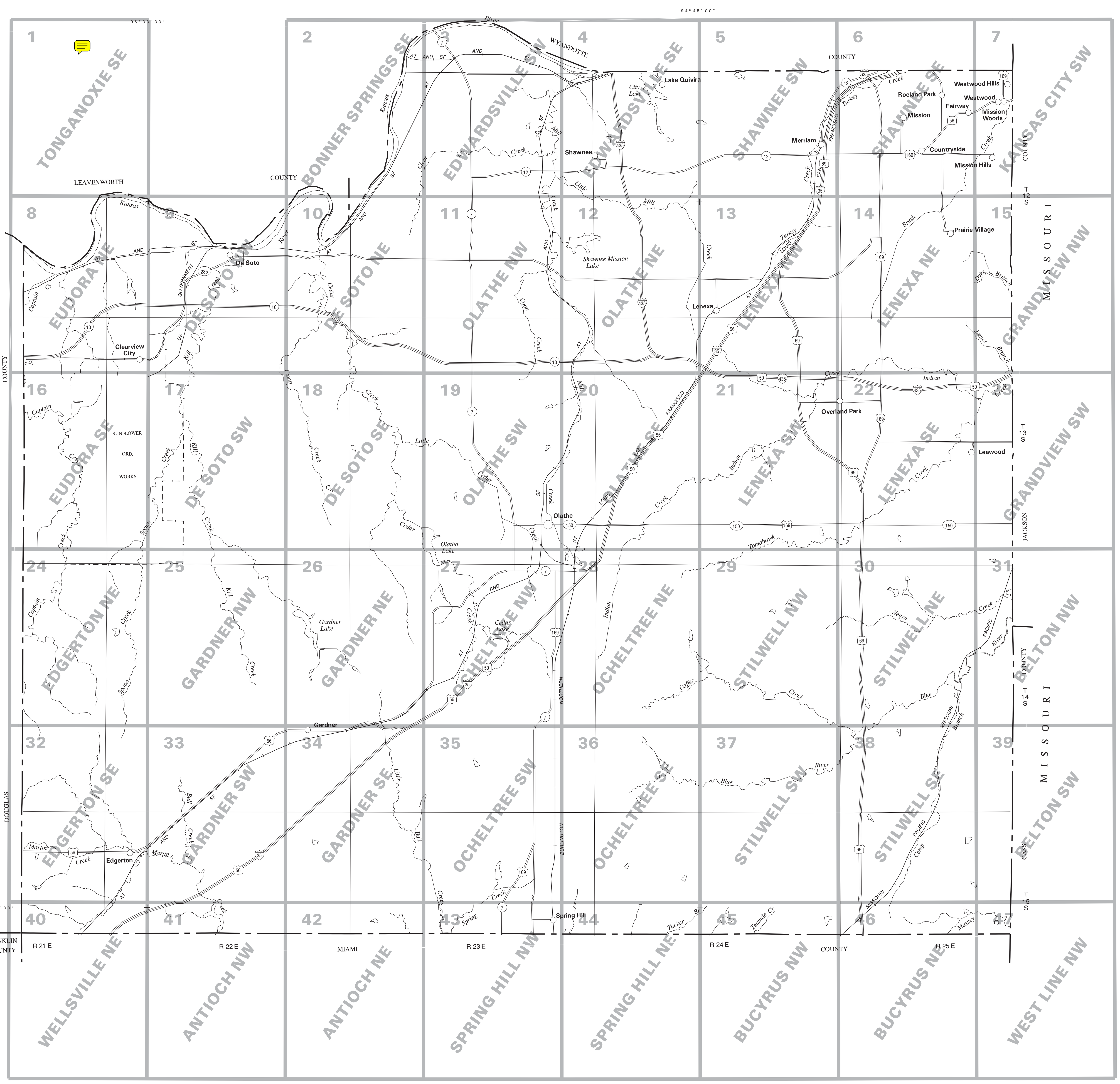

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

N

INDEX TO MAP SHEETS
JOHNSON COUNTY, KANSAS

MILES

KILOMETERS

SCALE = 1:90000

SOIL LEGEND

SYMBOL	NAME
4015	Chase silt loam, occasionally flooded
4752	Sogn-Vinland complex, 3 to 25 percent slopes
7031	Eudora silt loam, occasionally flooded
7035	Eudora-Bismarckgrove fine sandy loams, overwash, occasionally flooded
7036	Eudora-Bismarckgrove silt loams, occasionally flooded
7050	Kennebec silt loam, occasionally flooded
7051	Kennebec silt loam, frequently flooded
7055	Kimo silty clay loam, occasionally flooded
7089	Stonehouse-Eudora fine sandy loams, overwash, occasionally flooded
7090	Wabash silty clay loam, occasionally flooded
7105	Belvue silt loam, escarpment, 2 to 12 percent slopes
7106	Eudora-Bismarckgrove silt loams, rarely flooded
7123	Eudora silt loam, rarely flooded
7155	Kimo silty clay loam, rarely flooded
7170	Reading silt loam, rarely flooded
7251	Grundy silt loam, 1 to 3 percent slopes
7261	Gymer silt loam, 3 to 7 percent slopes
7285	Ladoga silt loam, 3 to 8 percent slopes
7286	Ladoga silt loam, 8 to 15 percent slopes
7302	Martin silty clay loam, 3 to 7 percent slopes
7330	Martin-Vinland silty clay loams, 5 to 10 percent slopes
7433	Morrill loam, 3 to 7 percent slopes
7460	Oska silty clay loam, 3 to 6 percent slopes
7462	Oska-Martin complex, 4 to 8 percent slopes
7502	Pawnee clay loam, 3 to 7 percent slopes
7525	Chillicothe silt loam, 2 to 5 percent slopes
7535	Sharpsburg silt loam, 4 to 8 percent slopes
7545	Sharpsburg-Urban land complex, 4 to 8 percent slopes
7603	Sibleyville loam, 3 to 7 percent slopes
7607	Sibleyville-Vinland loams, 3 to 7 percent slopes
7658	Vinland-Rock outcrop complex, 15 to 45 percent slopes
7805	Arisburg silt loam, 1 to 3 percent slopes
8101	Hepler silt loam, occasionally flooded
8301	Verdigris silt loam, frequently flooded
8302	Verdigris silt loam, occasionally flooded
8390	Wynona silt loam, occasionally flooded
8501	Mason silt loam, rarely flooded
8640	Bucyrus silt loam, 1 to 3 percent slopes
8641	Bucyrus silty clay loam, 3 to 8 percent slopes
8663	Clareson-Rock outcrop complex, 3 to 15 percent slopes
8789	Lebo channery silty clay loam, 15 to 30 percent slopes
8911	Summit silty clay loam, 1 to 3 percent slopes
8912	Summit silty clay loam, 3 to 7 percent slopes
8953	Wagstaff silt loam, 1 to 3 percent slopes
8955	Wagstaff silty clay loam, 3 to 7 percent slopes
8957	Wagstaff-Summit complex, 3 to 7 percent slopes
8962	Woodson silt loam, 1 to 3 percent slopes
9967	Landfill
9971	Arents, earthen dam
9982	Fluvents, frequently flooded
9983	Gravel pits and quarries
9984	Made land
9986	Miscellaneous water
9991	Orthents, shallow
9993	Pits
9999	Water

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park)
- Land grant
- Limit of soil survey (label) and/or denied access area
- Field sheet matchline & neatline
- Previously Published Survey

OTHER BOUNDARY (label)

- Airport, airfield
- Cemetery
- City/county park

STATE COORDINATE TICK
1 890 000 FEET

LAND DIVISION CORNER (section and land grants)

GEOGRAPHIC COORDINATE TICK

TRANSPORTATION

- Divided roads
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 173, 79 345
- Federal — 287, 410 224
- State — 52, 52 347
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad
- Single side slope (showing actual feature location)

DAMS

- Medium or Small — W

LANDFORM FEATURES

- Prominent hill or peak
- Soil Sample Site — S

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Other Religion (label) — Mt Carmel
- Located object (label) — Ranger Station
- Tank (label) — Petroleum
- Lookout Tower
- Oil and/or Natural Gas Wells
- Windmill
- Lighthouse

HYDROGRAPHIC FEATURES

STREAMS

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end

DRAINAGE AND IRRIGATION

- Double-line canal (label) — CANAL
- Perennial drainage and/or irrigation ditch
- Intermittent drainage and/ or irrigation ditch

SMALL LAKES, PONDS AND RESERVOIRS

- Perennial water
- Miscellaneous water
- Flood pool line — FLOOD POOL LINE

MISCELLANEOUS WATER FEATURES

- Spring
- Well, artesian
- Well, irrigation

SPECIAL SYMBOLS FOR SOIL SURVEY AND SSURGO

SOIL DELINEATIONS AND SYMBOLS — 4752 7261

LANDFORM FEATURES

ESCARPMENTS

- Bedrock
- Other than bedrock

SHORT STEEP SLOPE

GULLY

DEPRESSION, closed

SINKHOLE

EXCAVATIONS

PITS

- Borrow pits
- Gravel pit
- Mine or quarry

LANDFILL

MISCELLANEOUS SURFACE FEATURES

- Blowout
- Clay spot
- Gravelly spot
- Lava flow
- Marsh or swamp
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip
- Sodic spot
- Spoil area
- Stony spot
- Very stony spot
- Wet spot

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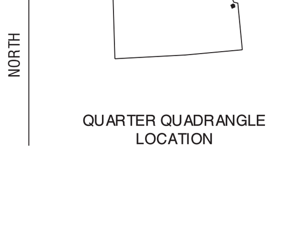
North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



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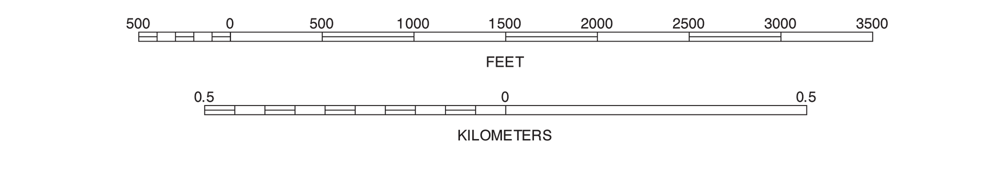

BONNER SPRINGS SE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 1 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
EDWARDSVILLE SW QUADRANGLE
SHEET NUMBER 2 OF 46

94° 52′30″ — 94° 48′45″
39° 03′45″

R. 23 E.

39° 00′00″

94° 52′30″ — R. 23 E. — 94° 48′45″

Joins sheet 1, Bonner Springs SE

Joins sheet 3, Edwardsville SE

Joins sheet 9, De Soto NE

Joins sheet 10, Olathe NW

Joins sheet 11, Olathe NE

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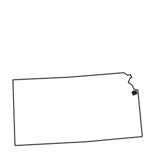
NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

EDWARDSVILLE SW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 2 OF 46

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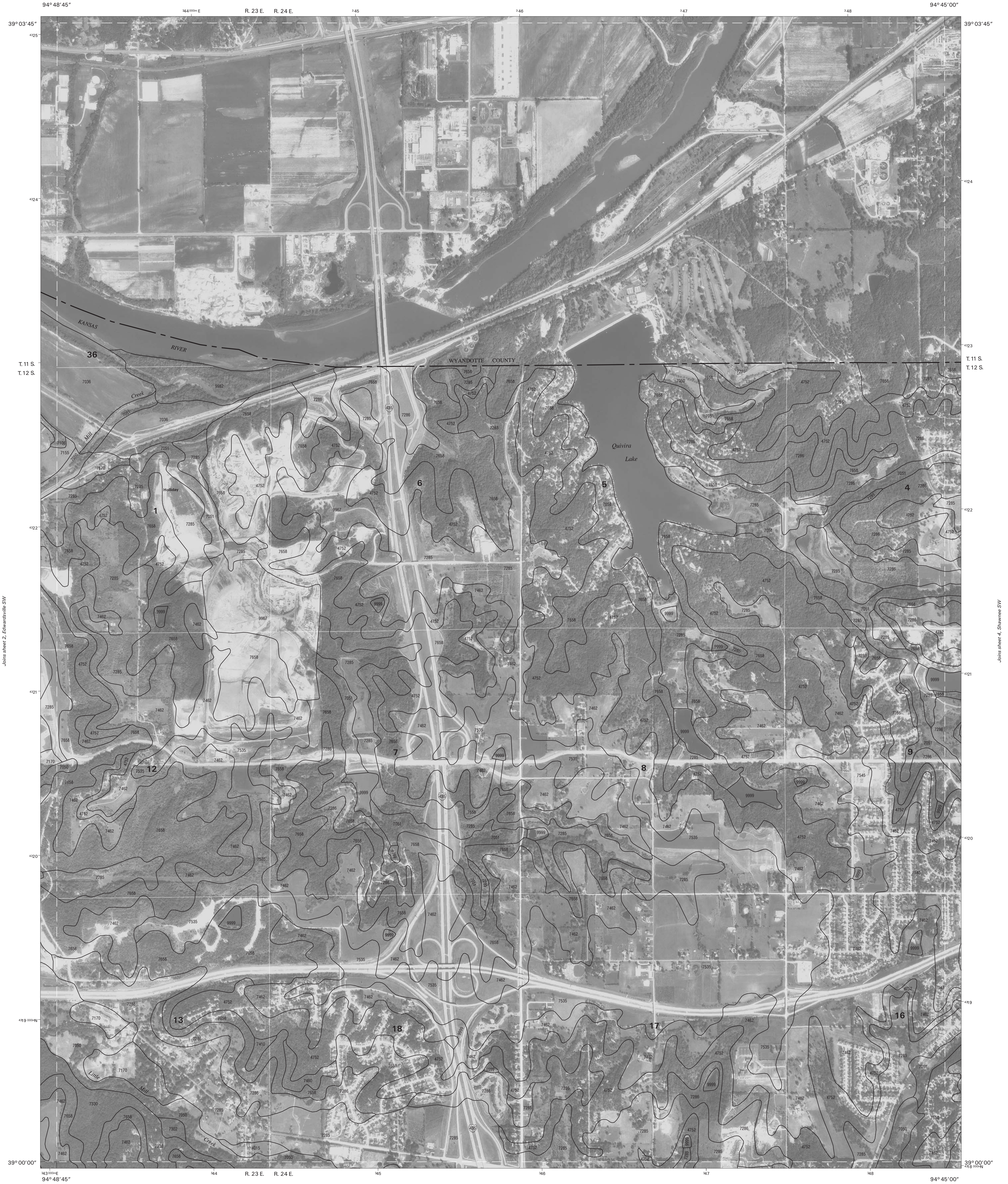
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
EDWARDSVILLE SE QUADRANGLE
SHEET NUMBER 3 OF 46



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North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

EDWARDSVILLE SE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 3 OF 46

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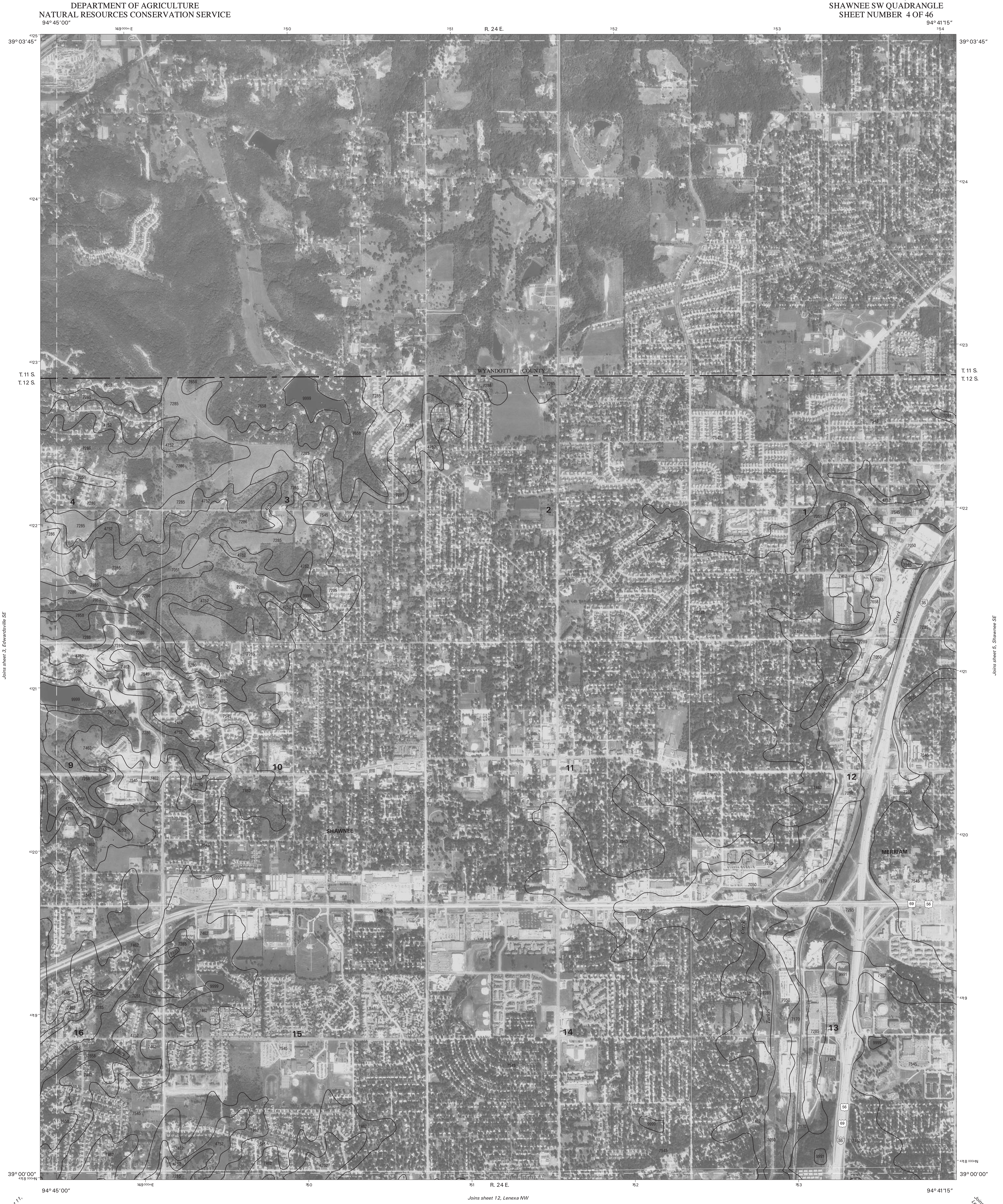
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
SHAWNEE SW QUADRANGLE
SHEET NUMBER 4 OF 46



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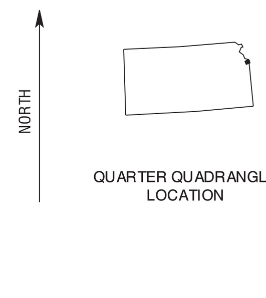

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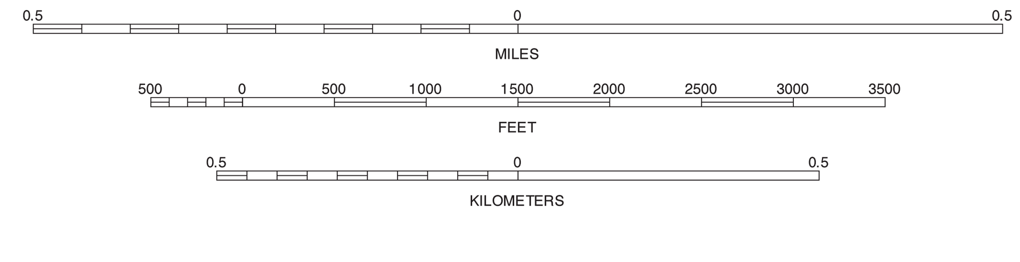

SHAWNEE SW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 4 OF 46

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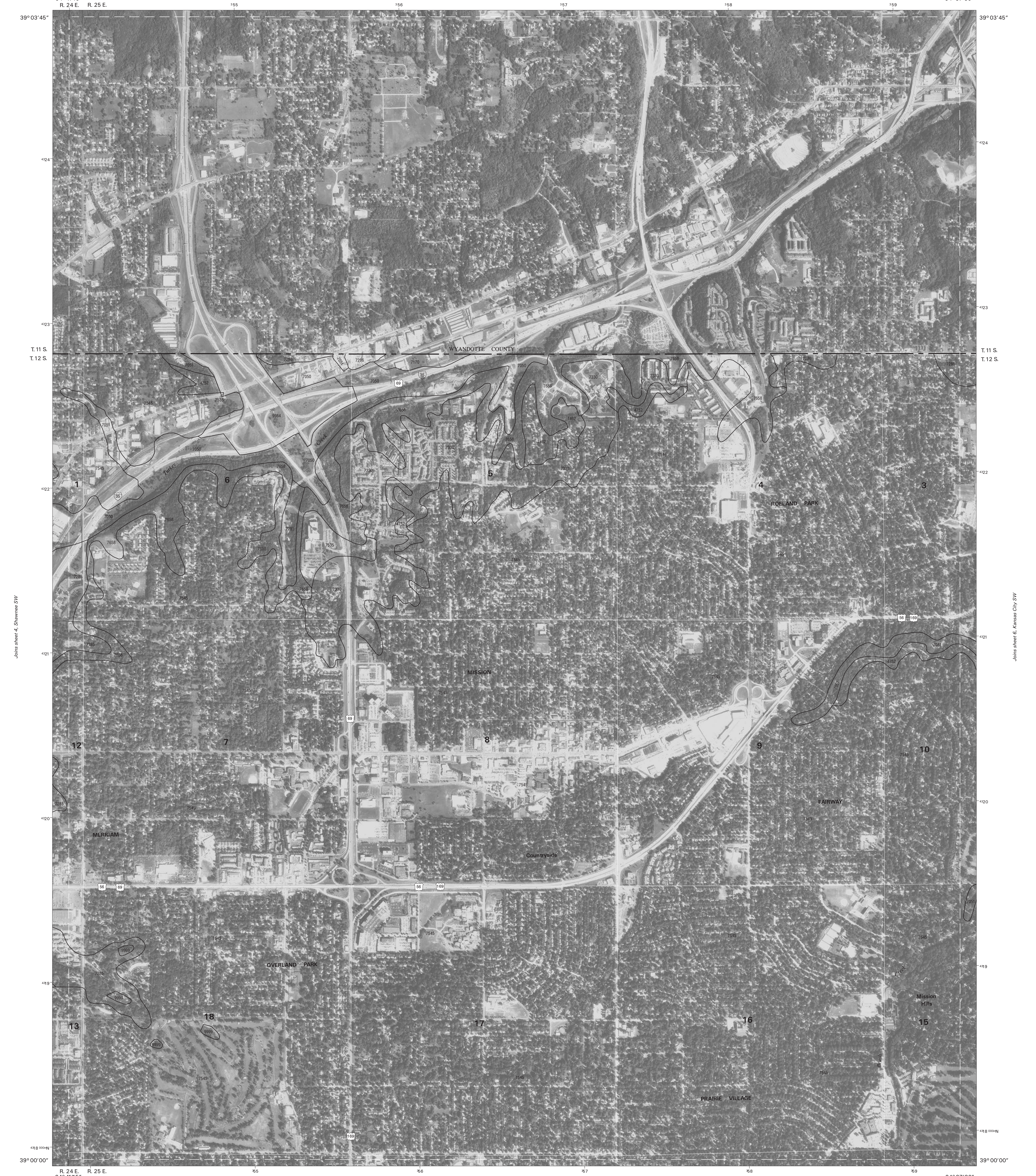

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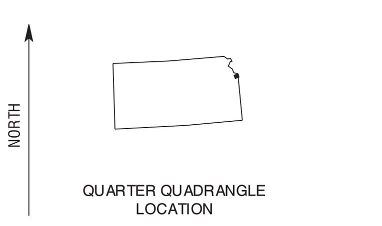
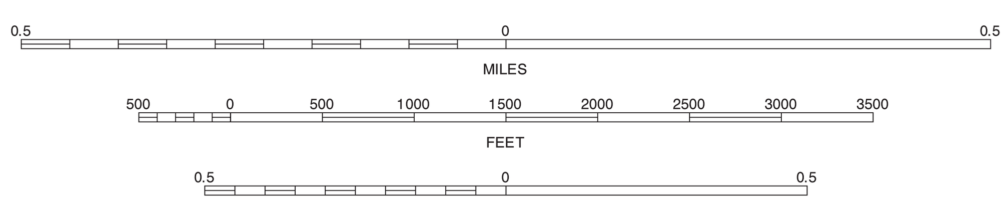


QUARTER QUADRANGLE LOCATION

SCALE 1:12000



SHAWNEE SE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 5 OF 46

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DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
KANSAS CITY SW QUADRANGLE
SHEET NUMBER 6 OF 46

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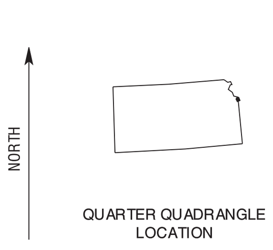
North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



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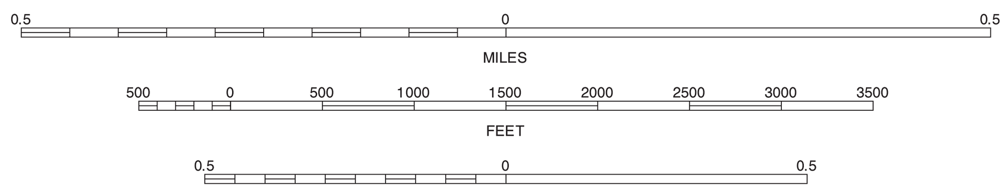

KANSAS CITY SW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 6 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
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NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
EUDORA NE QUADRANGLE (OVERSIZED)
SHEET NUMBER 7 OF 46

Joins sheet 15, Eudora SE

Joins sheet 16, De Soto SW

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North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

EUDORA NE, (OVERSIZED) KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 7 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
DE SOTO NW QUADRANGLE
SHEET NUMBER 8 OF 46

Joins sheet 1, Bonner Springs SE

95° 00′00″ R. 22 E. 94° 56′15″

39° 00′00″

38° 56′15″

95° 00′00″ R. 22 E. 94° 56′15″

Joins sheet 7, Eudora NE

Joins sheet 9, De Soto NE

Joins sheet 15, Eudora SE

Joins sheet 16, De Soto SW

Joins sheet 17, De Soto SE

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North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

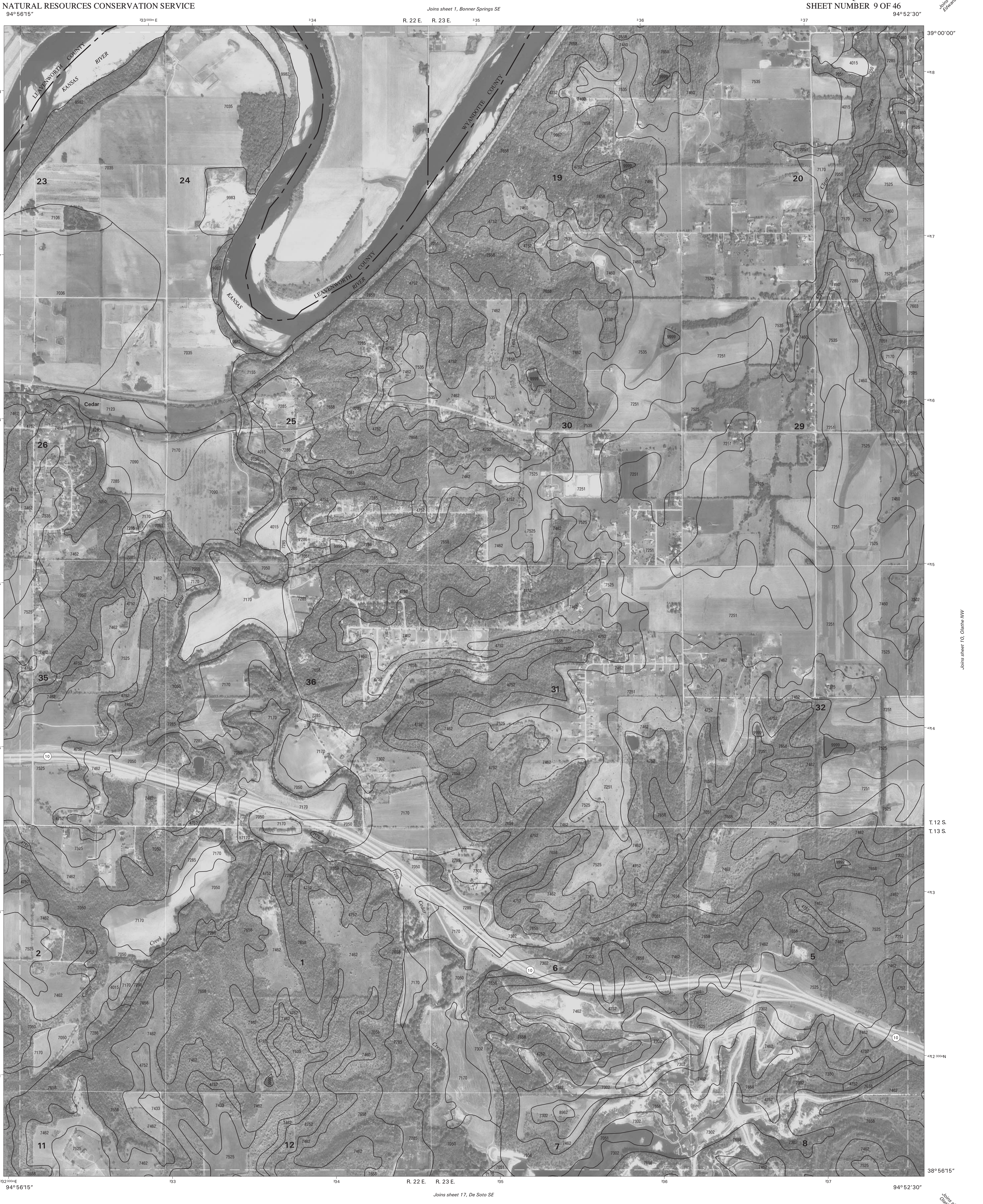
500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

DE SOTO NW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 8 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



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North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

DE SOTO NE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 9 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
OLATHE NW QUADRANGLE
SHEET NUMBER 10 OF 46

Joins sheet 1, Bonner Springs SE

Joins sheet 2, Edwardsville SW

Joins sheet 3, Edwardsville SE

94° 52′30″ 39° 00′00″ 94° 48′45″ 39° 00′00″

R. 23 E.

Joins sheet 9, De Soto NE

Joins sheet 11, Olathe NE

T. 12 S.
T. 13 S.

38° 56′15″ 94° 52′30″ 38° 56′15″ 94° 48′45″

R. 23 E.

Joins sheet 17, De Soto SE

Joins sheet 18, Olathe SW

Joins sheet 19, Olathe SE

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North American Datum of 1983(NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

OLATHE NW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 10 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
OLATHE NE QUADRANGLE
SHEET NUMBER 11 OF 46

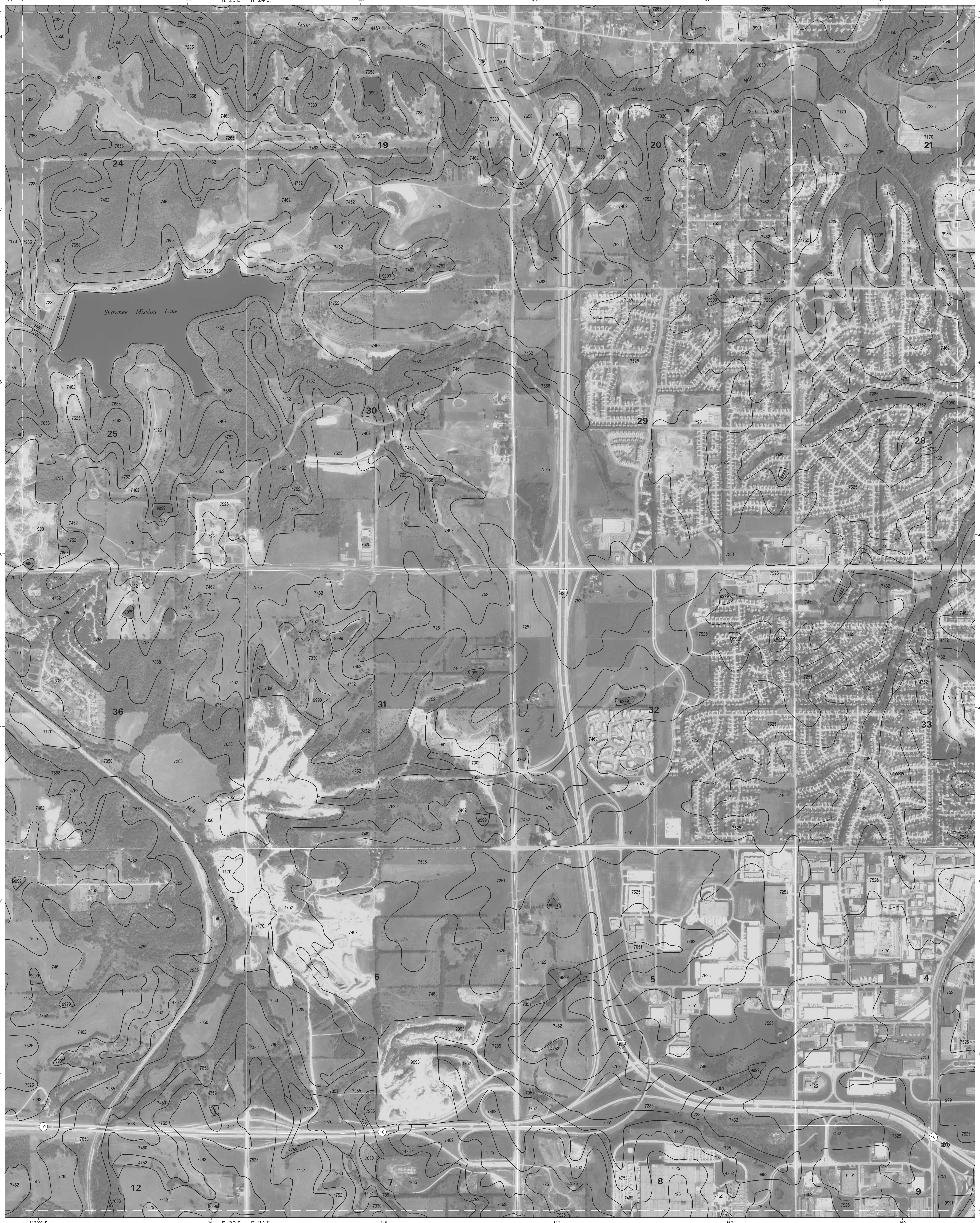
Joins sheet 2, Edwardsville SW

Joins sheet 3, Edwardsville SE

Joins sheet 4, Shawnee SW

94° 48′45″ | R. 23 E. | R. 24 E. | 94° 45′00″

39° 00′00″



Joins sheet 10, Olathe NW

Joins sheet 12, Lenexa NW

38° 56′15″

94° 48′45″ | R. 23 E. | R. 24 E. | 94° 45′00″

Joins sheet 18, Olathe SW

Joins sheet 19, Olathe SE

Joins sheet 20, Lenexa SW

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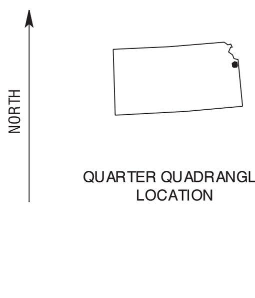
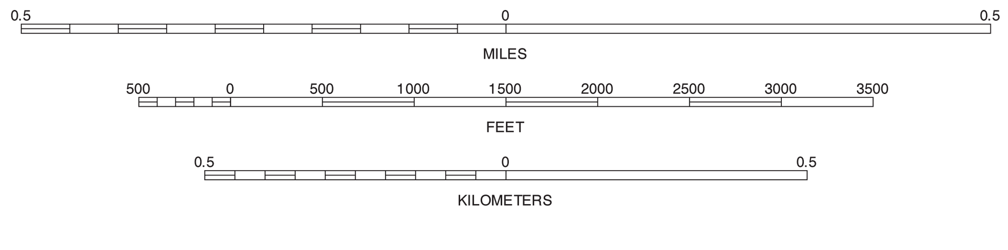
North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



SCALE 1:12000

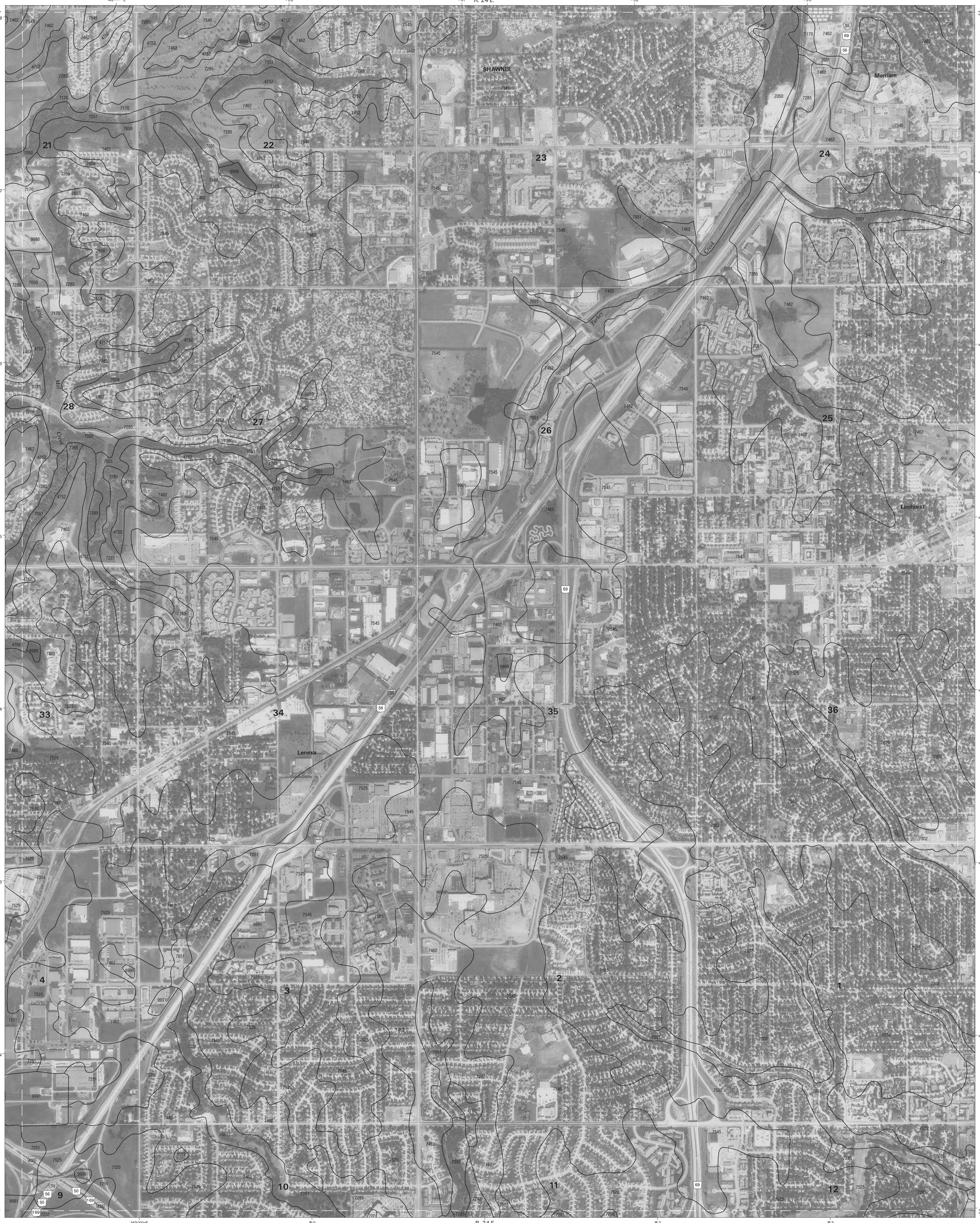


OLATHE NE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 11 OF 46

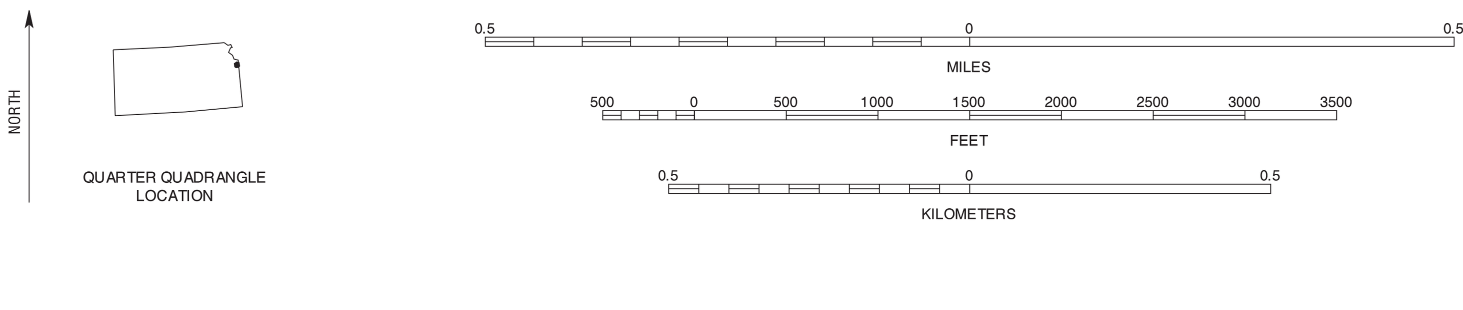
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
LENEXA NW QUADRANGLE
SHEET NUMBER 12 OF 46



SCALE 1:12000



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North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

LENEXA NW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 12 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
LENEXA NE QUADRANGLE
SHEET NUMBER 13 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES 0.5 0 0.5

FEET 500 0 500 1000 1500 2000 2500 3000 3500

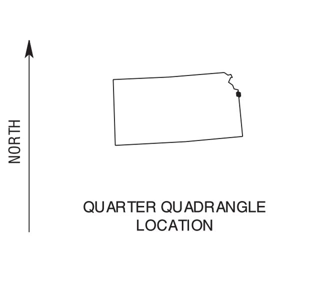
KILOMETERS 0.5 0 0.5

LENEXA NE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 13 OF 46

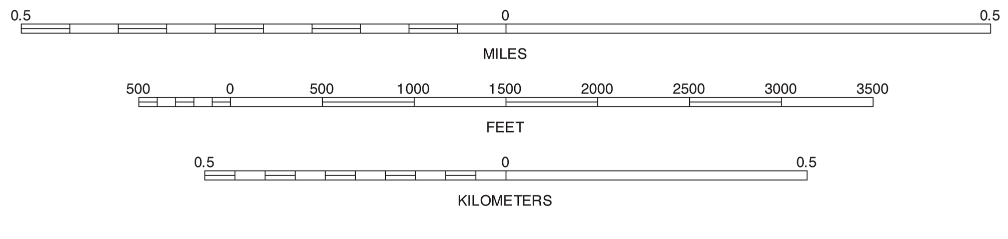
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



SCALE 1:12000



GRANDVIEW NW, KANSAS

3.75 MINUTE SERIES
SHEET NUMBER 14 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
EUDORA SE QUADRANGLE
SHEET NUMBER 15 OF 46

Joins sheet 7, Eudora NE

Joins sheet 8, De Soto NW

95° 03′45″ 95° 00′00″

38° 56′15″ 38° 56′15″

Joins sheet 16, De Soto SW

38° 52′30″ 38° 52′30″

95° 03′45″ 95° 00′00″

Joins sheet 23, Edgerton NE

Joins sheet 24, Gardner NW

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North American Datum of 1983(NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

EUDORA SE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 15 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 7, Eudora NE

Joins sheet 8, De Soto NW

Joins sheet 9, De Soto NE

95° 00′ 00″ 94° 56′ 15″

38° 56′ 15″ 38° 56′ 15″

38° 52′ 30″ 38° 52′ 30″

95° 00′ 00″ 94° 56′ 15″

R. 22 E.

Joins sheet 15, Eudora SE

Joins sheet 17, De Soto SE

Joins sheet 23, Edgerton NE

Joins sheet 24, Gardner NW

Joins sheet 25, Gardner NE

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North American Datum of 1983(NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

DE SOTO SW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 16 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

Joins sheet 8, De Soto NW

Joins sheet 9, De Soto NE

Joins sheet 10, Olathe NW

94° 56′15″ 94° 52′30″
38° 56′15″

38° 52′30″
94° 56′15″ 94° 52′30″

Joins sheet 16, De Soto SW

Joins sheet 18, Olathe SW

Joins sheet 24, Gardner NW

Joins sheet 25, Gardner NE

Joins sheet 26, Ocheltree NW

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North American Datum of 1983(NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

DE SOTO SE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 17 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
OLATHE SW QUADRANGLE
SHEET NUMBER 18 OF 46

SCALE 1:12000

MILES

FEET

KILOMETERS

NORTH

QUARTER QUADRANGLE LOCATION

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

OLATHE SW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 18 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

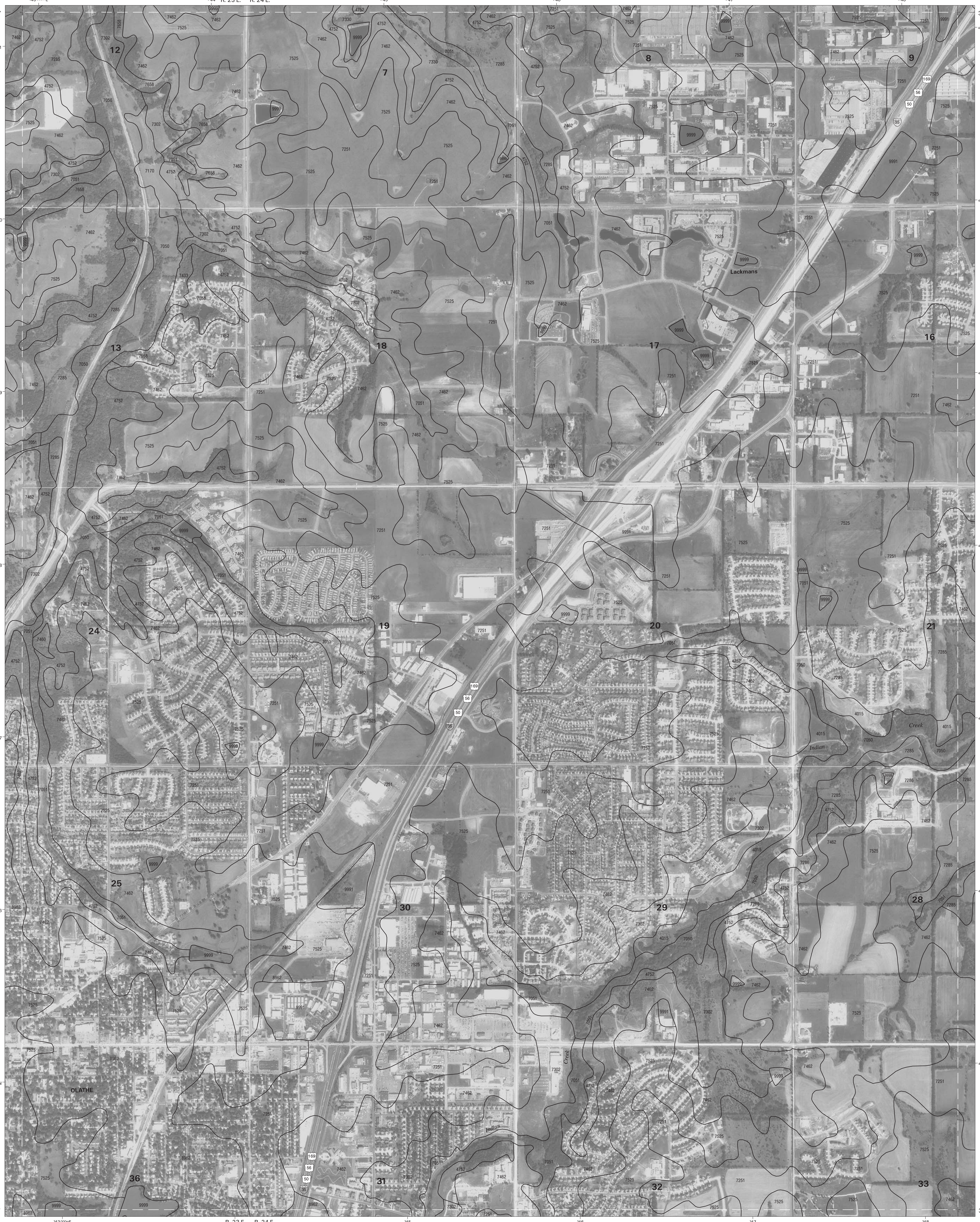
Joins sheet 10, Olathe NW

Joins sheet 11, Olathe NE

Joins sheet 12, Lenexa NW

94° 48′ 45″ 94° 45′ 00″

38° 56′ 15″



Joins sheet 18, Olathe SW

Joins sheet 20, Lenexa SW

38° 52′ 30″

94° 48′ 45″ 94° 45′ 00″

Joins sheet 26, Ocheltree NW

Joins sheet 27, Ocheltree NE

Joins sheet 28, Stilwell NW

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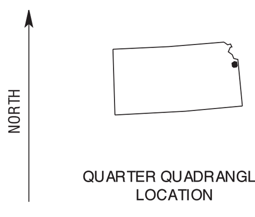
North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

OLATHE SE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 19 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

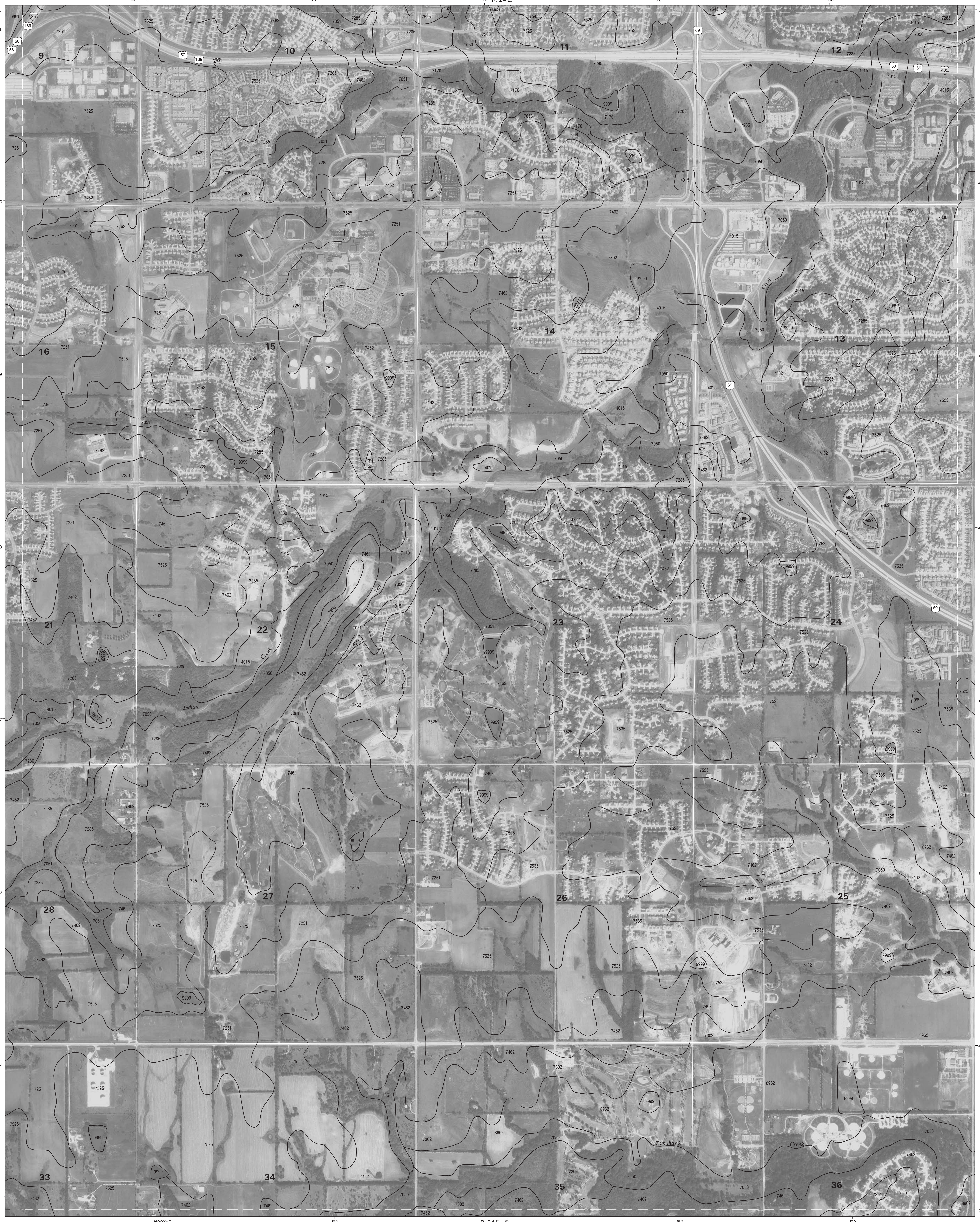
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
LENEXA SW QUADRANGLE
SHEET NUMBER 20 OF 46

Joins sheet 11, Olathe NE

Joins sheet 12, Lenexa NW

Joins sheet 13, Lenexa NE



Joins sheet 19, Olathe SE

Joins sheet 21, Lenexa SE

Joins sheet 27, Ochiltree NE

Joins sheet 28, Stilwell NW

Joins sheet 29, Stilwell NE

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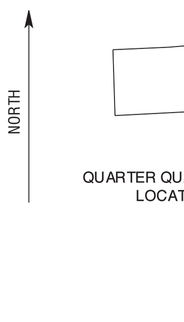
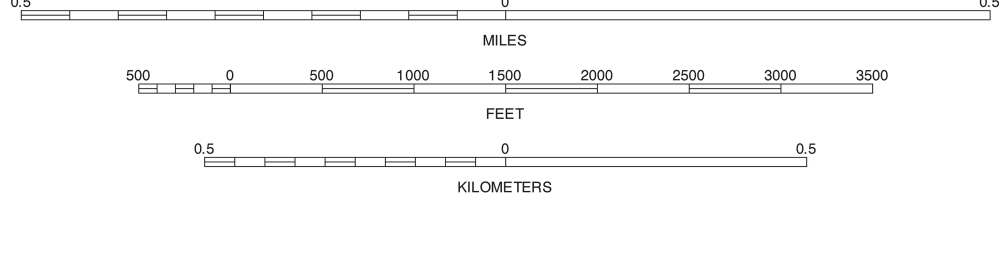
North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

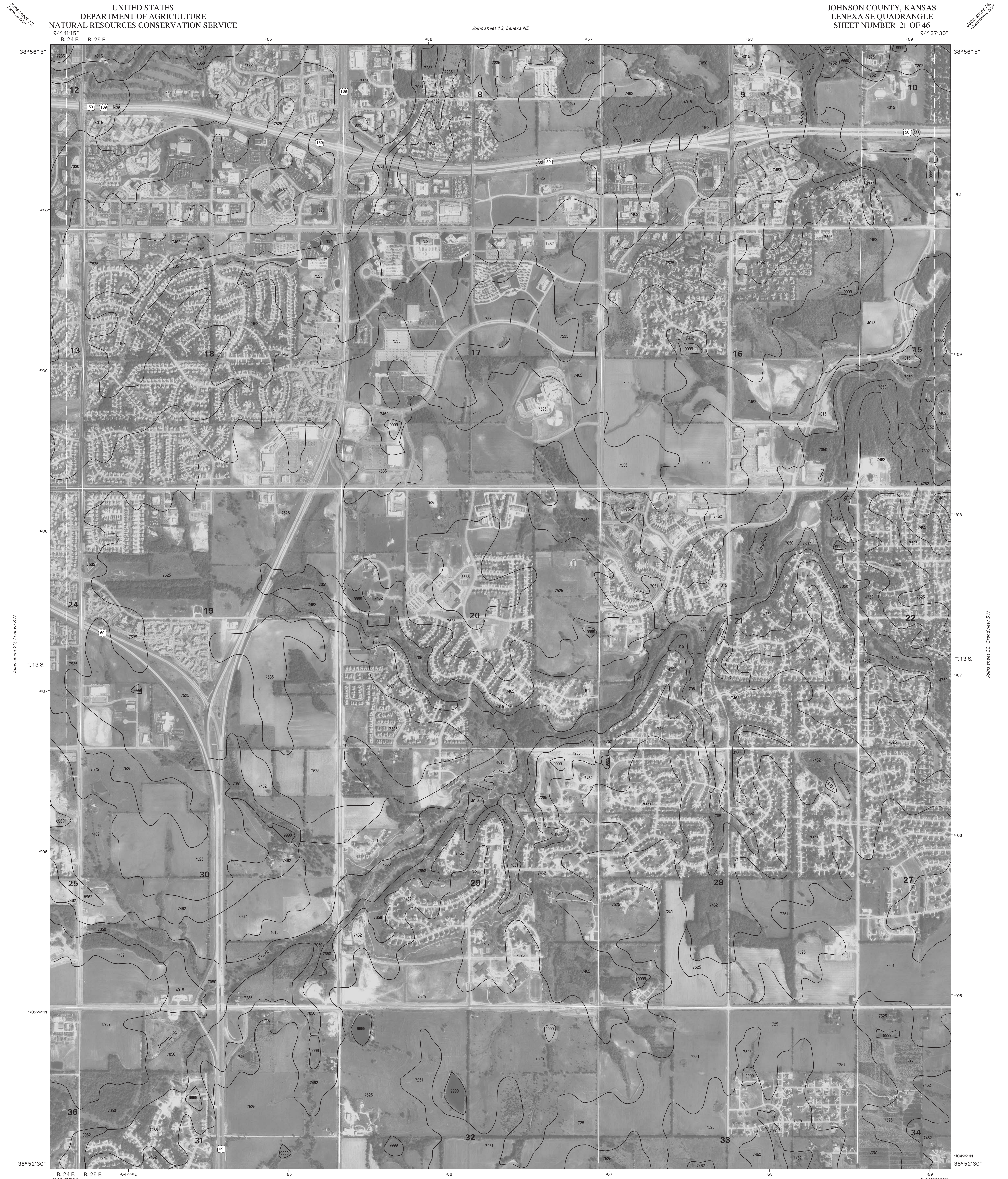


LENEXA SW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 20 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
LENEXA SE QUADRANGLE
SHEET NUMBER 21 OF 46



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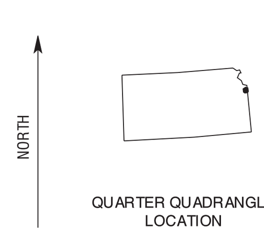
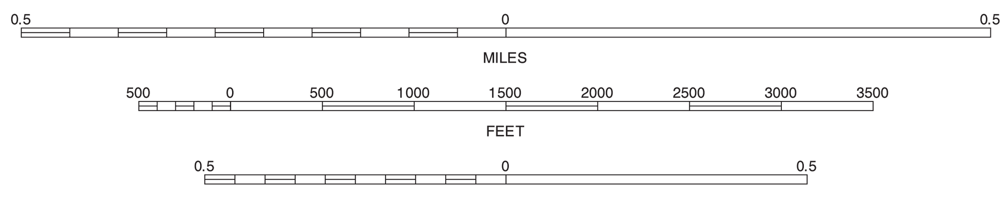
North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

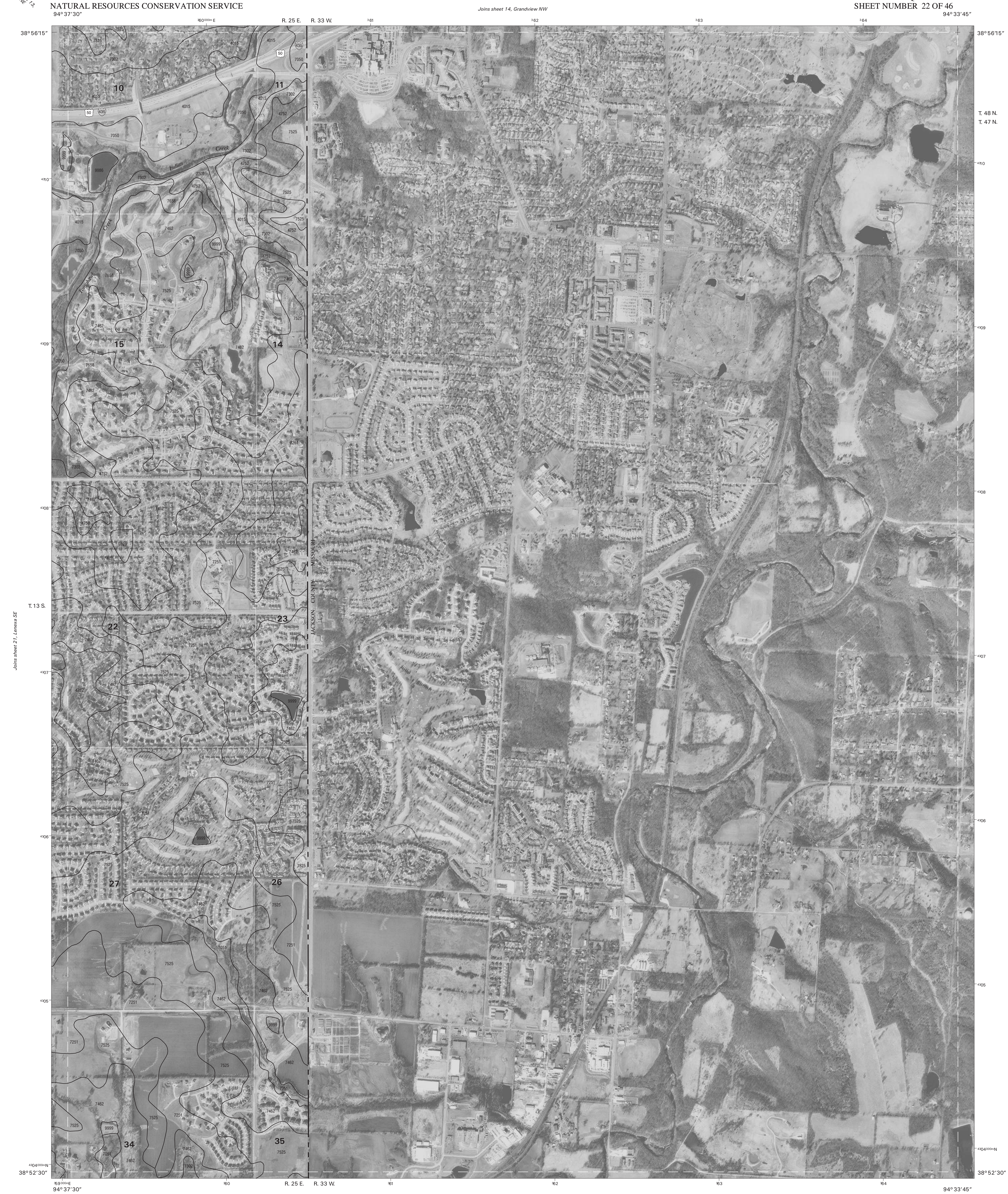


LENEXA SE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 21 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
GRANDVIEW SW QUADRANGLE
SHEET NUMBER 22 OF 46



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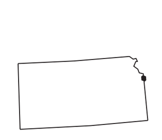
North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

GRANDVIEW SW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 22 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
EDGERTON NE QUADRANGLE
SHEET NUMBER 23 OF 46

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North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES 0.5 0 0.5

FEET 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS 0.5 0 0.5

EDGERTON NE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 23 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
GARDNER NW QUADRANGLE
SHEET NUMBER 24 OF 46

95° 00′00″ — R. 22 E. — 94° 56′15″
38° 52′30″

38° 48′45″
95° 00′00″ — ³27⁰⁰⁰ᵐE — ³28 — R. 22 E. — ³30 — ³31 — 94° 56′15″

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North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

GARDNER NW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 24 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
GARDNER NE QUADRANGLE
SHEET NUMBER 25 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

GARDNER NE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 25 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
OCHELTREE NW QUADRANGLE
SHEET NUMBER 26 OF 46

Joins sheet 17, De Soto SE

Joins sheet 18, Olathe SW

Joins sheet 19, Olathe SE

Joins sheet 33, Gardner SE

Joins sheet 34, Ocheltree SW

Joins sheet 35, Ocheltree SE

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

OCHELTREE NW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 26 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
OCHELTREE NE QUADRANGLE
SHEET NUMBER 27 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

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NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

OCHELTREE NE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 27 OF 46

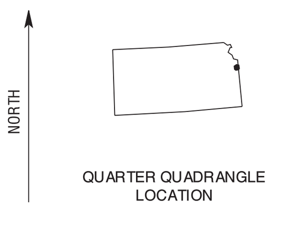
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

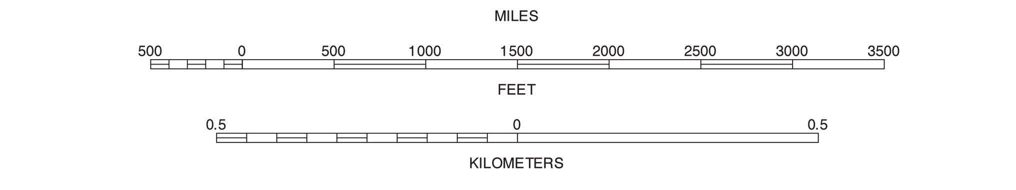
JOHNSON COUNTY, KANSAS
STILWELL NW QUADRANGLE
SHEET NUMBER 28 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



SCALE 1:12000



STILWELL NW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 28 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
STILWELL NE QUADRANGLE
SHEET NUMBER 29 OF 46

Joins sheet 20, Lenexa SW

Joins sheet 21, Lenexa SE

Joins sheet 22, Grandview SW

Joins sheet 36, Stilwell SW

Joins sheet 37, Stilwell SE

Joins sheet 38, Belton SW

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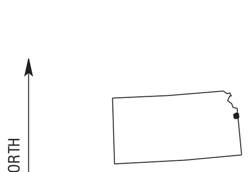
North American Datum of 1983(NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

STILWELL NE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 29 OF 46

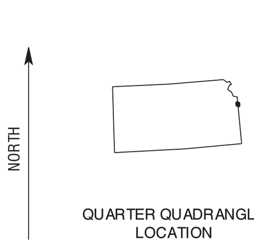
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

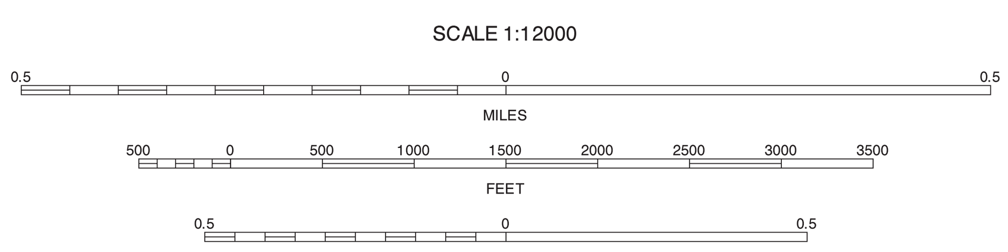
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
BELTON NW QUADRANGLE
SHEET NUMBER 30 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.





BELTON NW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 30 OF 46

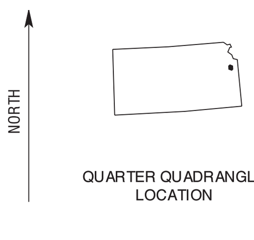
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
EDGERTON SE QUADRANGLE
SHEET NUMBER 31 OF 46

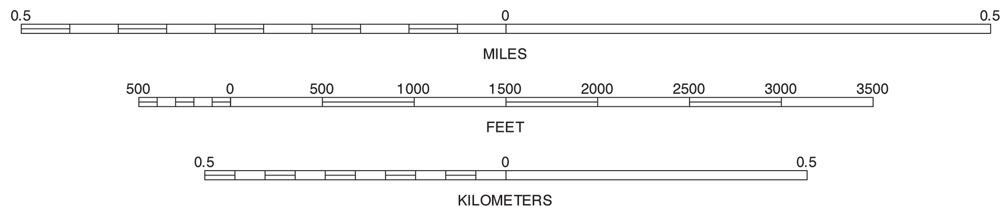
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000



EDGERTON SE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 31 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 23, Edgerton NE

Joins sheet 24, Gardner NW

Joins sheet 25, Gardner NE

95° 00′00″ 94° 56′15″

38° 48′45″ R. 22 E. 38° 48′45″

T. 14 S.
T. 15 S.

Joins sheet 31, Edgerton SE

Joins sheet 33, Gardner SE

38° 45′00″ R. 22 E. 38° 45′00″

95° 00′00″ 94° 56′15″

Joins sheet 39, Wellsville NE

Joins sheet 40, Antioch NW

Joins sheet 41, Antioch NE

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North American Datum of 1983(NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

GARDNER SW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 32 OF 46

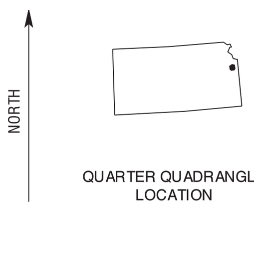
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

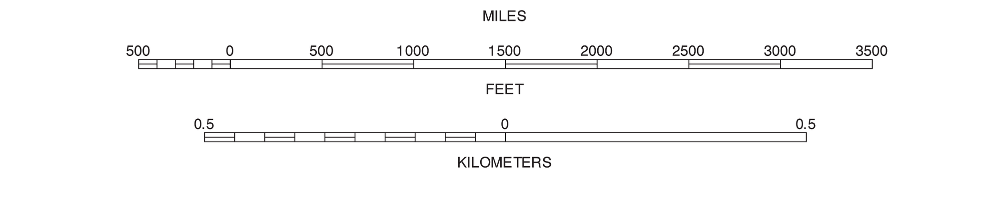
JOHNSON COUNTY, KANSAS
GARDNER SE QUADRANGLE
SHEET NUMBER 33 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



SCALE 1:12000



GARDNER SE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 33 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
OCHELTREE SW QUADRANGLE
SHEET NUMBER 34 OF 46

Joins sheet 26, Ocheltree NW

Joins sheet 42, Spring Hill NW

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

OCHELTREE SW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 34 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

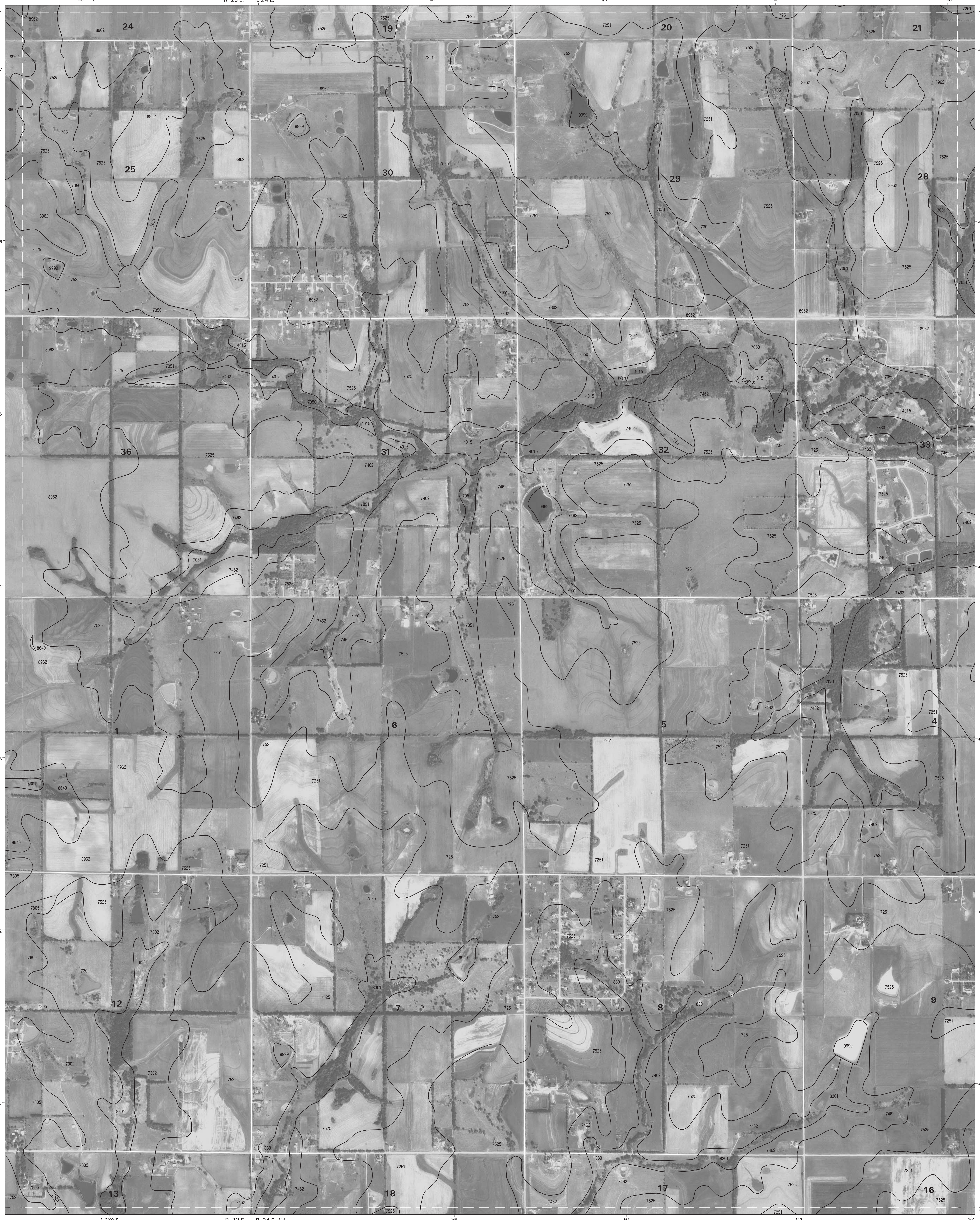
Joins sheet 26, Ocheltree NW

Joins sheet 27, Ocheltree NE

Joins sheet 28, Stilwell NW

94° 48′ 45″ | R. 23 E. | R. 24 E. | 94° 45′ 00″

38° 48′ 45″



38° 45′ 00″

94° 48′ 45″ | 343000mE | R. 23 E. | R. 24 E. | 344 | 345 | 346 | 347 | 348 | 94° 45′ 00″

Joins sheet 34, Ocheltree SW

Joins sheet 36, Stilwell SW

Joins sheet 42, Spring Hill NW

Joins sheet 43, Spring Hill NE

Joins sheet 44, Bucyrus NW

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North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

OCHELTREE SE, KANSAS

3.75 MINUTE SERIES
SHEET NUMBER 35 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
STILWELL SW QUADRANGLE
SHEET NUMBER 36 OF 46

Joins sheet 27, Ochelltree NE

Joins sheet 29, Stilwell NE

Joins sheet 28, Stilwell NW

94° 45′ 00″   R. 24 E.   94° 41′ 15″

38° 48′ 45″

38° 45′ 00″

94° 45′ 00″   R. 24 E.   94° 41′ 15″

Joins sheet 35, Ochelltree SE

Joins sheet 37, Stilwell SE

Joins sheet 44, Bucyrus NW

Joins sheet 43, Spring Hill NE

Joins sheet 45, Bucyrus NE

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North American Datum of 1983(NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5   0   0.5
MILES

500   0   500   1000   1500   2000   2500   3000   3500
FEET

0.5   0   0.5
KILOMETERS

STILWELL SW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 36 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
STILWELL SE QUADRANGLE
SHEET NUMBER 37 OF 46

Joins sheet 28, Stilwell NW

Joins sheet 29, Stilwell NE

Joins sheet 30, Belton NW

94° 41'15" R. 24 E. R. 25 E. 94° 37'30"

38° 48'45"

38° 45'00"

R. 24 E. R. 25 E. 94° 41'15" 94° 37'30"

Joins sheet 36, Stilwell SW

Joins sheet 38, Belton SW

Joins sheet 44, Bucyrus NW

Joins sheet 45, Bucyrus NE

Joins sheet 46, West Line NW

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North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

STILWELL SE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 37 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
BELTON SW QUADRANGLE
SHEET NUMBER 38 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

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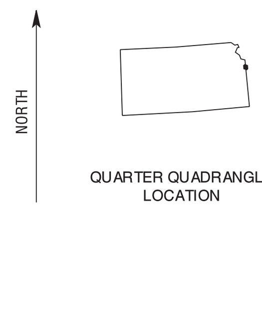
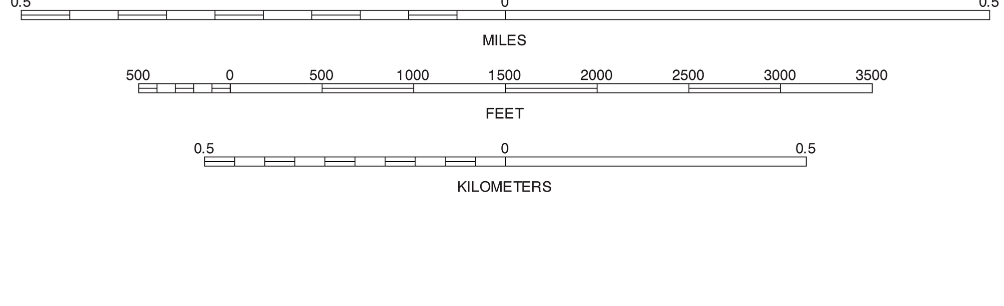


QUARTER QUADRANGLE LOCATION

SCALE 1:12000



BELTON SW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 38 OF 46

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UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
WELLSVILLE NE QUADRANGLE
SHEET NUMBER 39 OF 46

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North American Datum of 1983(NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

WELLSVILLE NE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 39 OF 46

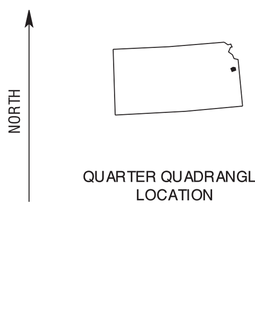
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

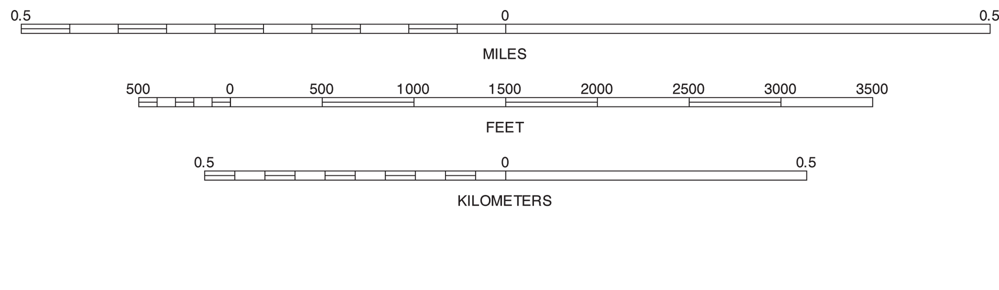
JOHNSON COUNTY, KANSAS
ANTIOCH NW QUADRANGLE
SHEET NUMBER 40 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



SCALE 1:12000



ANTIOCH NW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 40 OF 46

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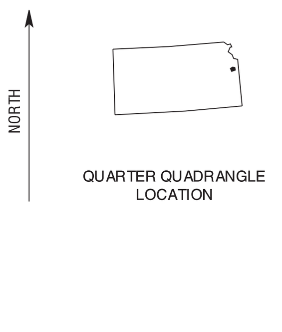
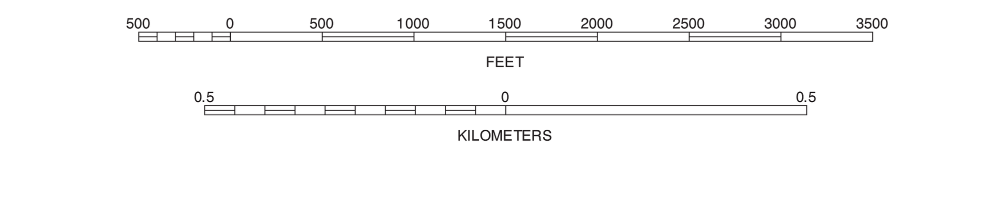


SCALE 1:12000



ANTIOCH NE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 41 OF 46

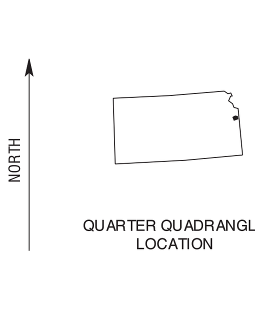
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

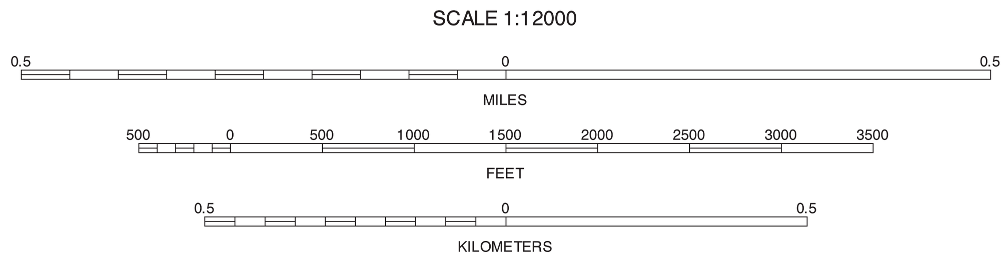
JOHNSON COUNTY, KANSAS
SPRING HILL NW QUADRANGLE
SHEET NUMBER 42 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



SCALE 1:12000



SPRING HILL NW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 42 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
SPRING HILL NE QUADRANGLE
SHEET NUMBER 43 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

SPRING HILL NE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 43 OF 46

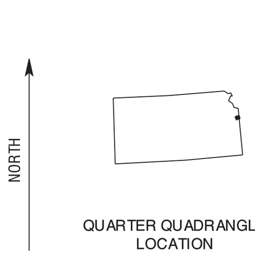
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
BUCYRUS NW QUADRANGLE
SHEET NUMBER 44 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

BUCYRUS NW, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 44 OF 46

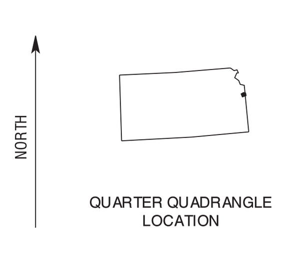
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
BUCYRUS NE QUADRANGLE
SHEET NUMBER 45 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1991-1998 aerial photography. Public land survey system (PLSS) were acquired from U.S. Geological Survey.

North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



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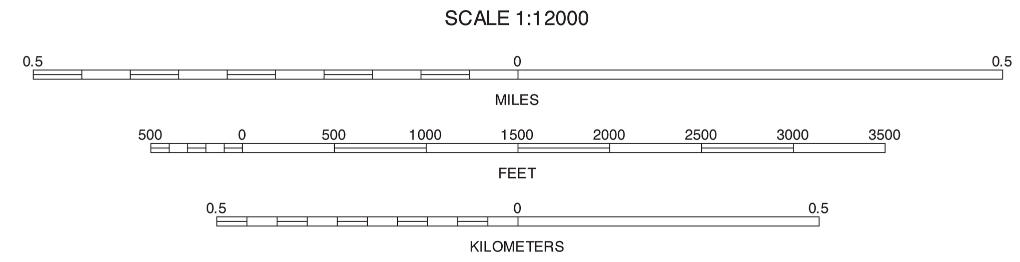

BUCYRUS NE, KANSAS
3.75 MINUTE SERIES
SHEET NUMBER 45 OF 46

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

JOHNSON COUNTY, KANSAS
WEST LINE NW QUADRANGLE
SHEET NUMBER 46 OF 46

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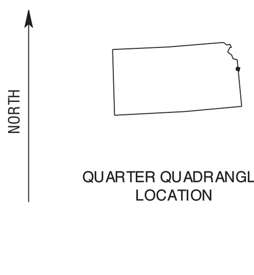
North American Datum of 1983(NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

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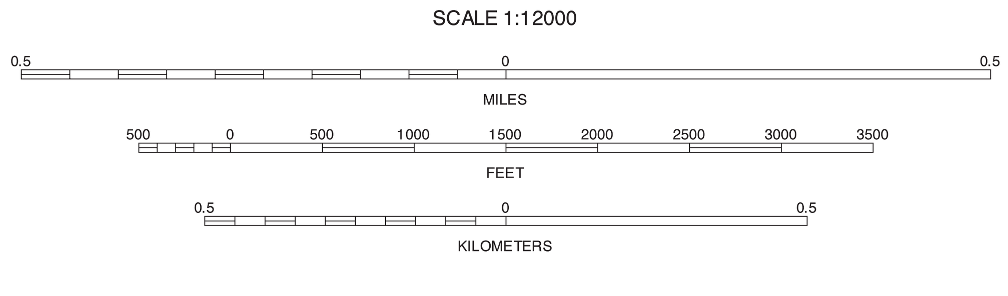

WEST LINE NW, KANSAS

3.75 MINUTE SERIES
SHEET NUMBER 46 OF 46

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